Full-scale commercial production of the following new transportation and mechanical goods dispersant-free, black masterbatches is now underway—

BAYTOWN 1811
100 parts SBR polymer
75 parts SRF black
17.5 parts highly aromatic processing oil
rosin/staining

BAYTOWN 8675
100 parts SBR polymer
50 parts HAF black
9 parts naphthenic processing oil
rosin/staining

BAYTOWN 8677
100 parts SBR polymer
52 parts HAF black
10 parts highly aromatic processing oil
rosin/staining

BAYTOWN 8680
100 parts SBR polymer
52 parts HAF black
15 parts highly aromatic processing oil
rosin/staining

BAYTOWN 8681
100 parts SBR polymer
50 parts ISAF black
15 parts highly aromatic processing oil
rosin/staining

BAYTOWN 8775
100 parts SBR polymer
75 parts HAF black
37.5 parts aromatic extending oil
mixed/staining

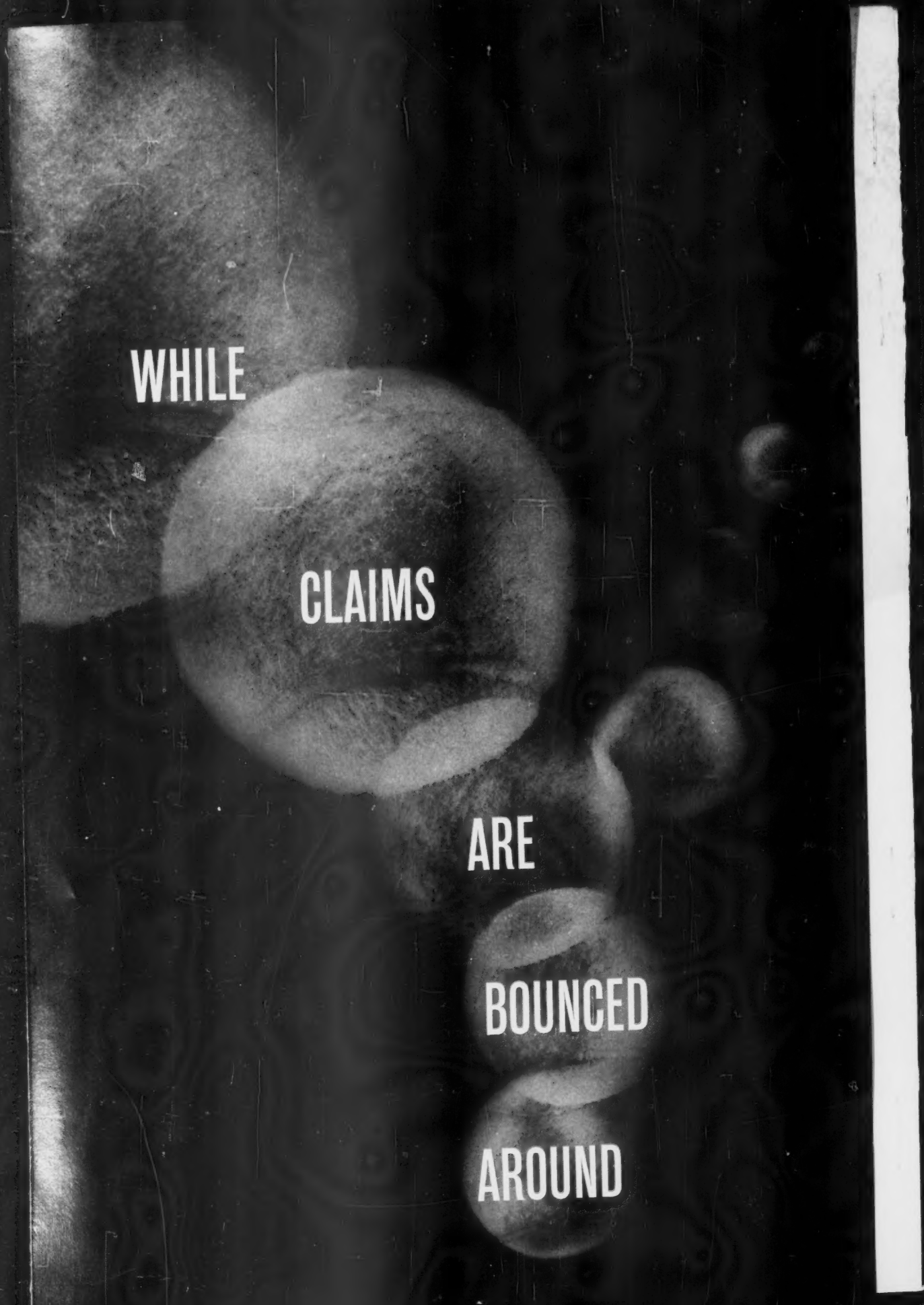
BAYTOWN 8776
100 parts SBR polymer
50 parts HAF black
37.5 parts naphthenic oil
mixed/non-staining

BAYTOWN 8778
100 parts SBR polymer
75 parts HAF black
37.5 parts highly aromatic extending oil
12.5 parts highly aromatic processing oil
mixed/staining

BAYTOWN 8779
100 parts SBR polymer
75 parts HAF black
37.5 parts naphthenic extending oil
12.5 parts naphthenic processing oil
mixed/non-staining

BAYTOWN 8781
100 parts SBR polymer
55 parts ISAF black
37.5 parts aromatic oil
mixed/staining

BAYTOWN...THE BIRTHPLACE OF BLACK MASTERBATCH

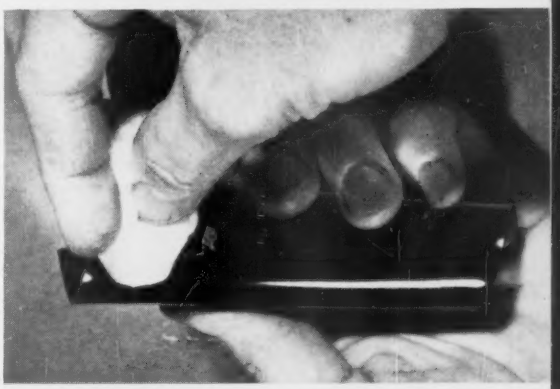

WHILE
CLAIMS
ARE
BOUNCED
AROUND

HOW SULFASAN R ANSWERS YOUR CURING NEEDS IN NONBLOOMING, SCORCH-FREE, HEAT-RESISTANT COMPOUNDS OF SBR AND NATURAL RUBBER

Results with scores of different stocks compounded with SULFASAN R, powerful organic-type vulcanizing agent, all show increased heat resistance, greatly reduced scorch . . . and *no bloom* even after months of aging.

Economical SULFASAN R frequently trims costs, too . . . substantially reduces the total amount of curing agents required. About 1% of SULFASAN R on the rubber plus a small amount of THIURAD (tetramethylthiuram disulfide) achieves good results with most SBR and natural compounds.

Without SULFASAN R—*Stock Blooms Readily*



With SULFASAN R—*No Bloom at All*

SPECIFICATION: Withstand 70 hours @ 250° F. and 24 hours @ 325° F. in air oven without cracking when flexed 180°

COMPOUNDS	**A**	**B**	**C**
SBR 1500	100	100	100
Black	75	75	75
Zinc Oxide	5	5	5
Stearic Acid	1	1	1
Santoflex 75	1	1	1
Flectol H	2	2	2
Santocure	2	2	2
THIURAD	3.5	1.25	1.25
SULFASAN R	——	1.25	0.75
CURING AGENT COST	$3.99	$3.36	$2.59
TYPICAL RESULTS			
Mooney Scorch (Large Rotor @ 250° F.)			
Minutes for 10-point rise	8	11½	13
Unaged			
Tensile, psi	1880	2130	2070
Elongation, %	480	440	515
Hardness	60	60	59
Aged 70 Hours @ 250° F.			
Tensile, psi	2100	2260	2210
Elongation, %	260	235	290
Hardness	69	69	68
BLOOM	Immediately	None in 9 months	None in 9 months

SULFASAN R gives excellent aging at reduced cost . . . won't stain or discolor white rubbers. SULFASAN R disperses readily. Works well for butyl and Buna-N as well as SBR and natural rubbers . . . especially when used with SANTOCURE and other sulfenamide accelerators.

For further information about unique SULFASAN R, or help with a compounding project, write or phone, today.

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Rubber Chemicals Dept.
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HEmlock 4-1921

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...well secured

In pioneer days it was considered smart to travel with the man who could tie a "Diamond Hitch." In modern times it is to your advantage to be securely tied to a supplier on whom you can depend for a continuing supply of top quality product.

At Odessa, Texas, we operate the world's largest channel black plant. Here we maintain constant top quality in **TEXAS EPC** and **MPC,** plus special grades for the ink, paint, and plastic industries.

Now under construction at Big Spring, Texas, is our new oil furnace black plant which will have an annual capacity of 50,000,000 pounds of **HAF** and **ISAF** blacks. The very latest engineering and technical advancements, from complete instrumentation to an entirely new type of furnace, are to be embodied in this plant.

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

OCTOBER, 1960 VOL. 88, NO. 1

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Highlights Sidelights *of the News . . .*

October, 1960

The Attorney General of the United States, in his Fifth Annual Report on "Competition in the Synthetic Rubber Industry," advises that there is a healthy competitive situation in the industry . . . During 1959, he said, the industry rose to a new plateau of operations pitched to a scale of demand never before encountered (page 104).

The 78th Meeting of the Division of Rubber Chemistry, A.C.S., held in New York City on September 14 to 16, featured a full technical program; an announcement of new officers for the 1960-61 season, and the naming of the 1961 Goodyear Medalist, Dr. H. A. Winkelmann, (Dryden Rubber) . . . A meeting of the 25-Year Club was also held (page 107).

Fourteen synthetic rubber companies in the United States, Canada, England and West Germany have completed the organization of the International Institute of Synthetic Rubber Producers . . . Representatives of two companies from Japan and Italy also participated in the establishment of the Institute, but have not yet formally joined the organization (page 121).

Twenty-five papers will be presented in five technical sessions during the Ninth Annual Wire and Cable Symposium to be held from November 30 to December 2 at the Berkeley-Carteret Hotel in Asbury Park, N. J. . . . The symposium is jointly sponsored by the U.S. Army Signal Research and Development Laboratory and industry (page 124).

According to preliminary figures released by the U.S. Tariff Commission, plasticizer output in the United States hit an all-time high of 524 million pounds in 1959, a 25.4 per cent increase over the 418 milion pounds produced in 1958 . . . Plasticizer sales in 1959 amounted to 462 million pounds valued at $138 million, compared to 356 million pounds valued at $111 million in 1958 (page 125).

An international symposium on problems in chemistry and physics dealing with high molecular fusion was held at Moscow University in June . . . It is reported that more than 1,200 persons were in attendance, representing more than 30 countries . . . Professors H. Marks and P. Doty of the United States were present (page 120).

A new technique for the manufacture of urethane foam has been developed by DuPont . . . The company claims that the new process should broaden the urethane foam market (page 123).

BUTAC

Tackifiers & bloom inhibitors for natural & synthetic rubbers

NATAC

TURGUM S

Tackifies
inhibits flex-cracking
aids processing
reduces scorch

AKTONE

Accelerator activator
recommended for natural rubber-SBR combinations
neutralizes odor in microcellular sponge

for rubber reinforcing pigments, think of Huber

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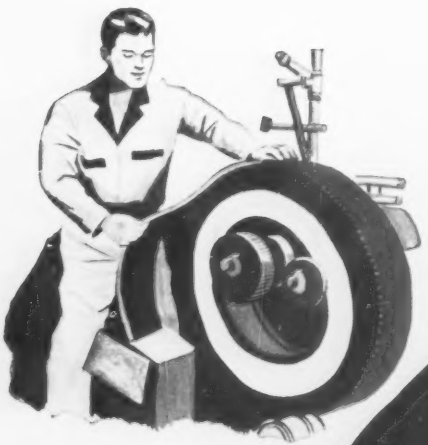
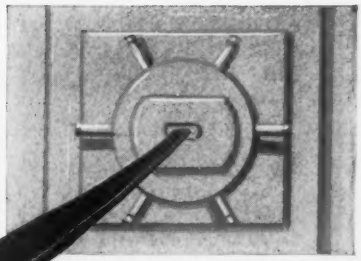


THE GENERAL TIRE & RUBBER COMPANY

Jet®



MAKES TREAD RUBBER BETTER

Use Gentro-Jet, General Tire's new steam-whipped black masterbatch, to get extra quality in tread rubber while enjoying amazing ease of manufacture. Gentro-Jet is available in a variety of compositions to meet every need. It's easy to handle, and eliminates mixing problems encountered when loose black is involved.

Gentro-Jet's high quality and superior dispersion is evidenced by its excellent die conformity . . . you get a better end product, plus easier, faster processing, all at a lower cost than with dry mix masterbatches.

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- Easier, cleaner handling
- Faster processing
- Increased road wear
- High gloss, high density extrusions
- Economy in shipping, storage and handling

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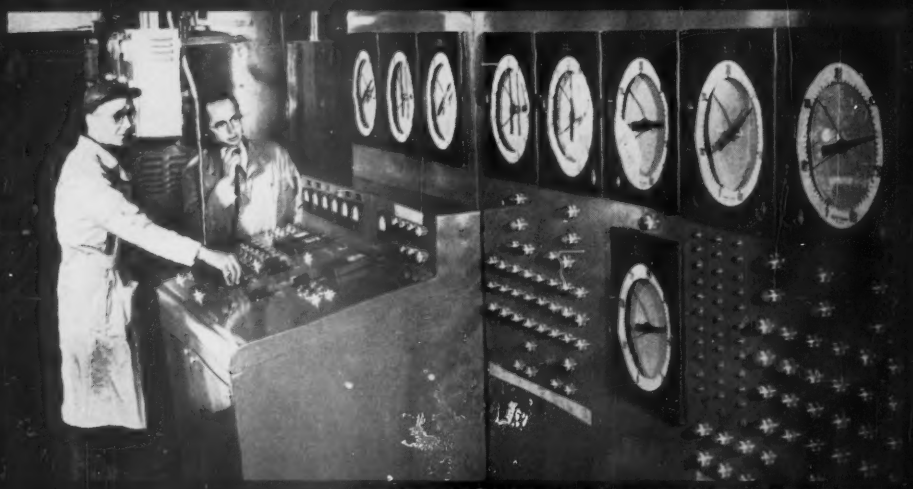
START UP. . . moment of truth



Control Center + Calendar Treating Line Photo courtesy Armstrong Rubber Manufacturing Co.

Whether the simplest kind of equipment installation — or the world's first triple-zone rayon/nylon calendar line as shown here — the moment of startup is the culmination of months of calculation and construction . . . an inexorable test of soundness of engineering, skill of manufacture and field erection.

This unique new process line — highly advanced in operation and control — performed at startup, and after a brief two-week testing and minor adjustment period exploring the multiple operating possibilities, went into full-time production at 60 ypm.

Achieving anticipated operating results from the moment of startup is the rule with Litzler fabric treating lines and units. "Our plant engineer reports that the unit has operated very satisfactorily since the time of its installation"* . . . and "Having completed the installation of the subject machine, we want to express our satisfaction at the way it is working and at first results"* . . . are typical judgements of owners.

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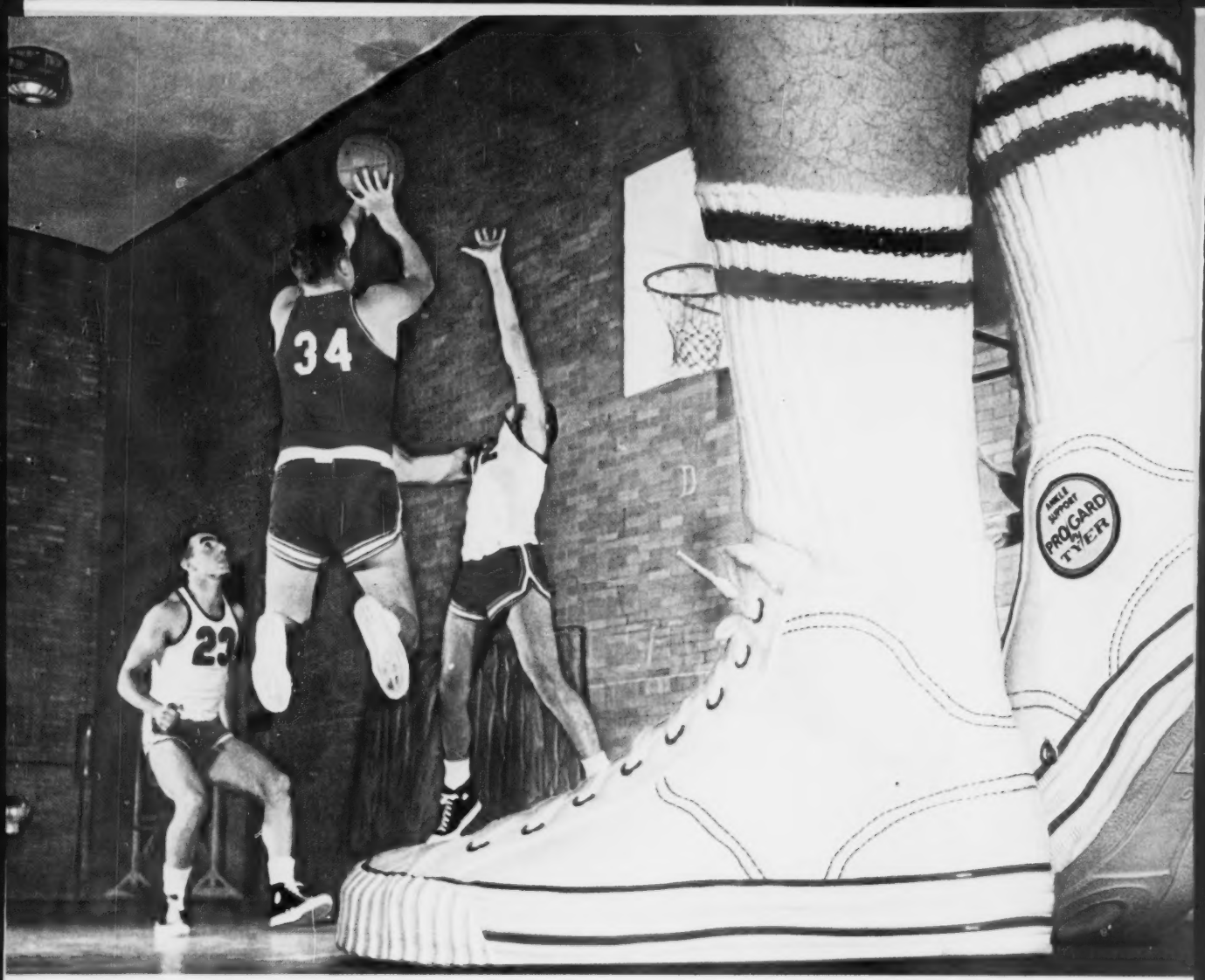

Footwear manufactured by Tyer Rubber Company, Andover, Mass.

How to get the jump on competition

You can't miss with a quality product that's got an exclusive feature of wide appeal. For example, consider the basketball shoes above. They offer everything you'd expect—sure-footed traction, light weight, good resilience, attractive appearance, easy washability—*plus* an "exclusive" that's caught on fast.

This sales-sparking "extra" is a combination ankle support and protective guard that's built right into the shoe. To produce this unique feature, a versatile sponge rubber compound was needed. Chosen: PLIOFLEX—for its unrivaled uniformity and good blowing characteristics.

In other parts of the shoe, PLIOFLEX was used because of its light color and remarkable retention of calendered designs. In the sole, PLIOFLEX provides outstanding nonslip qualities and exceptional flexibility. It also assures better adhesion of rubber to canvas. Throughout the shoe, PLIOFLEX means long wear. And—happily for the manufacturer—PLIOFLEX usually means a substantial reduction in costs.

If you're looking for a compound that can put your product on a better competitive footing, it will pay you to look into PLIOFLEX—now used in more products than any other synthetic rubber. For complete information, write Goodyear, Chemical Division, Dept. V-9419, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMI-VIC puts you on the right track against ozone attack!

The basic feature of new CHEMI-VIC is well described in the photograph above. That's CHEMI-VIC on the left, compared to a similar, currently popular elastomer, after 144 hours in an ozone box (100 pphm) at 100°F.

CHEMI-VIC is brand new—a vinyl reinforced nitrile elastomer. In addition to outstanding resistance to ozone and weather, it offers high physical properties plus exceptional resistance to oil. Moreover, it's easy to compound and process on standard equipment.

New CHEMI-VIC is available in two grades: CHEMI-VIC 400 for general purposes. CHEMI-VIC 800 for extrusion and calendering application. Typical uses: hose, belting, wire and cable jacketing, weather stripping, integral molded shoe soles. More information? Just write Goodyear, Chemical Division, Dept. V-9419, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Chemi-Vic—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

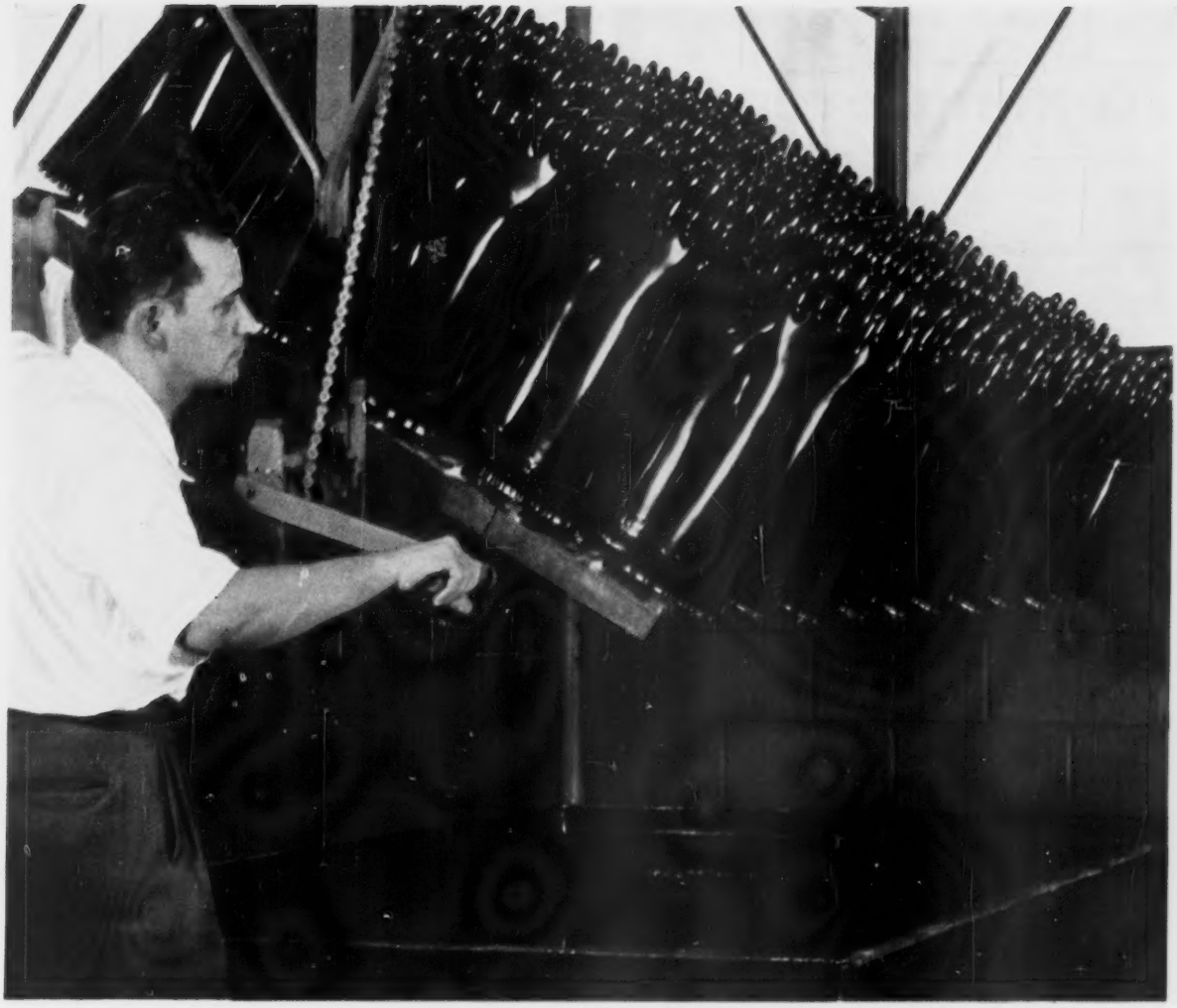

Photo taken through the courtesy of Charleston Rubber Company, Charleston, S. C.

Chemigum gives protection with a "plus"

Handling "hot" chemicals calls for safety gloves with unique properties. Not only must these gloves resist the strongest kind of chemical action, they must also remain soft and pliant. They must offer this "plus" without puncturing, distorting or tearing.

Impossible requirements? Not for CHEMIGUM, the original nitrile rubber by Goodyear. A leading manufacturer in the field of safety wearing apparel has found that CHEMIGUM more than fills the bill of requirements, with the added advantage of exceptional oil- and solvent-resistance.

What's more, Chemigum is easy to process. It is readily milled – quickly forms uniform, stable, true molecular solvent solutions which, through multiple dipping, produce gloves of greater protective and wearing qualities.

If you can use an outstanding oil- and chemical-resistant rubber with outstanding processing properties, it will pay you to learn more about CHEMIGUM. For complete information–including latest *Tech Book Bulletins*–write: Goodyear, Chemical Division, Dept. V-9419, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Chemigum – T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

coming events

Oct. 17-19. Electrical Insulation Conference, Sponsored by the National Academy of Sciences-National Research Council, Mayflower Hotel, Washington, D. C.

Oct. 17-19. International Congress on Technology of Plastics Processing & International Plastics Exhibition, Amsterdam, The Netherlands.

Oct. 17-21. Forty-Eighth National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago, Ill.

Oct. 18. Commercial Chemical Development Association and Chemical Economics Division, Chemical Institute of Canada, Joint Meeting, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

Oct. 18. Elastomer and Plastics Group, Northeastern Section, ACS, Morse Auditorium, Science Park, Boston, Mass.

Oct. 18-21. American Society for Testing Materials, Committee D-13 on Textile Materials, Fall Meeting, Sheraton-Atlantic Hotel, New York, N. Y.

Oct. 19-20. National Association of Corrosion Engineers, North Central Region Conference, Schroeder Hotel, Milwaukee, Wisc.

Oct. 19-26. International Instrumentation and Automation Fair, "Interkama," Duesseldorf, West Germany.

Oct. 19-26. Second International Plastics Fair, Macroplastics, Utrecht, The Netherlands.

Oct. 20. Quebec Rubber & Plastics Group, Technical Meeting, Montreal, Quebec, Canada.

Oct. 21. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 23-27. National Shoe Fair, Palmer House, Chicago, Ill.

Oct. 23-30. Societe de Chimie Industrielle, 32nd International Congress of Industrial Chemistry, Barcelona, Spain.

Oct. 24-26. Canadian Manufacturers of Chemical Specialties Association, Annual Meeting, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

Oct. 25. Association of Consulting Chemists & Chemical Engineers, Annual Meeting, Hotel Shelburne, New York, N. Y.

Oct. 25-27. American Standards Association, National Conference on Standards, Sheraton-Atlantic Hotel, New York, N. Y.

Oct. 25-28. National Association of Corrosion Engineers, South Central Region Conference, Mayo Hotel, Tulsa, Okla.

Oct. 25-Nov. 5. Montreal International Trade Fair, Show Mart, Montreal, Quebec, Canada.

Oct. 26-27. Armour Research Foundation, Computer Applications Symposium, Morrison Hotel, Chicago, Ill.

Oct. 26-27. Industrial Hygiene Foundation, 25th Annual Meeting, Mellon Institute, Pittsburgh, Penna.

Oct. 27-28. Cellulose Research Institute, 3rd Cellulose Conference, State University College of Forestry, Syracuse University, Syracuse, N. Y.

Oct. 27-29. Association of American Battery Manufacturers, Fall Convention, Palmer House, Chicago, Ill.

Oct. 28. Akron Rubber Group, Technical Meeting, Sheraton-Mayflower Hotel, Akron, Ohio.

Nov. 1. Los Angeles Rubber Group, Technical Meeting, Los Angeles, Calif.

Nov. 3. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 4. Akron Polymer Lectures, "Effect of Oxygen on Vulcanized Rubber," University of Akron, Akron, Ohio.

Nov. 4. Philadelphia Rubber Group, Fall Dance, Manufacturers' Country Club, Oreland, Penna.

Nov. 7-9. Chemical Institute of Canada, Chemical Engineering Division, 10th Canadian Chemical Engineering Conference, Chateau Frontenac, Quebec City, Quebec, Canada.

Nov. 8. Ontario Rubber Group, Technical Meeting, Crest Hotel, Preston, Ontario, Canada.

Nov. 9-10. Chemical Market Research Association, Annual Meeting, Pittsburgh-Hilton Hotel, Pittsburgh, Pa.

Nov. 10. Northern California Rubber Group, Elks Club, Berkeley, Calif.

Nov. 13-15. Toy Production Show, 2nd Annual Exhibition, Trade Show Building, New York, N. Y.

Nov. 14. Salesmen's Association of the American Chemical Industry, Annual Sales Clinic, Roosevelt Hotel, New York, N. Y.

Nov. 14-16. National Foreign Trade Council, National Meeting, Waldorf-Astoria Hotel, New York, N. Y.

Nov. 14-17. Wire Association, Annual Convention, La Salle Hotel, Chicago, Ill.

Nov. 16. Quebec Rubber & Plastics Group, Joint Meeting with Montreal Section, Chemical Institute of Canada, Montreal, Quebec, Canada.

Nov. 17. New Products Industrial Symposium, Sponsored by Quantum, Inc., Yankee Silversmith Inn, Wallingford, Conn.

Nov. 18. Rubber Science Hall of Fame Symposium, Co-sponsored by the University of Akron and Akron Rubber Group, University of Akron, Akron, Ohio.

Nov. 18. Chicago Rubber Group, Technichal Meeting, Furniture Club, Chicago, Ill.

Nov. 18. Connecticut Rubber Group.

Nov. 22. Manufacturing Chemists' Association, 10th Semi-Annual Meeting and Mid-Year Conference, Statler Hilton Hotel, New York, N. Y.

Nov. 25. Rubber Chemicals Salesmen's Association of Akron, University Club, Akron, Ohio.

Nov. 28-Dec. 2. American Society of Mechanical Engineers, Annual Meeting, Statler Hilton Hotel, New York, N. Y.

Nov. 29. New Products Industrial Symposium, Sponsored by Quantum, Inc., Harvard Club, Boston, Mass.

Nov. 30-Dec. 2. British Plastics Federation, 2nd International Reinforced Plastics Conference, Cafe Royal, London, England.

Nov. 30-Dec. 2. Ninth Annual Wire & Cable Symposium, Berkeley-Carteret Hotel, Asbury Park, N. J.

Dec. 1. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 2. Akron Polymer Lectures, "Single Crystals and Folding of Macromolecules," University of Akron, Akron, Ohio.

Dec. 3. Northern California Rubber Group, Christmas Party.

Dec. 3-9. Chemical Specialties Manufacturers Association, 47th Annual Meeting, Hollywood Beach Hotel, Hollywood, Fla.

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SBR SYNTHETIC RUBBER

HOT TYPES	COLD TYPES	COLD OIL-EXTENDED TYPES
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1006	1502	1712
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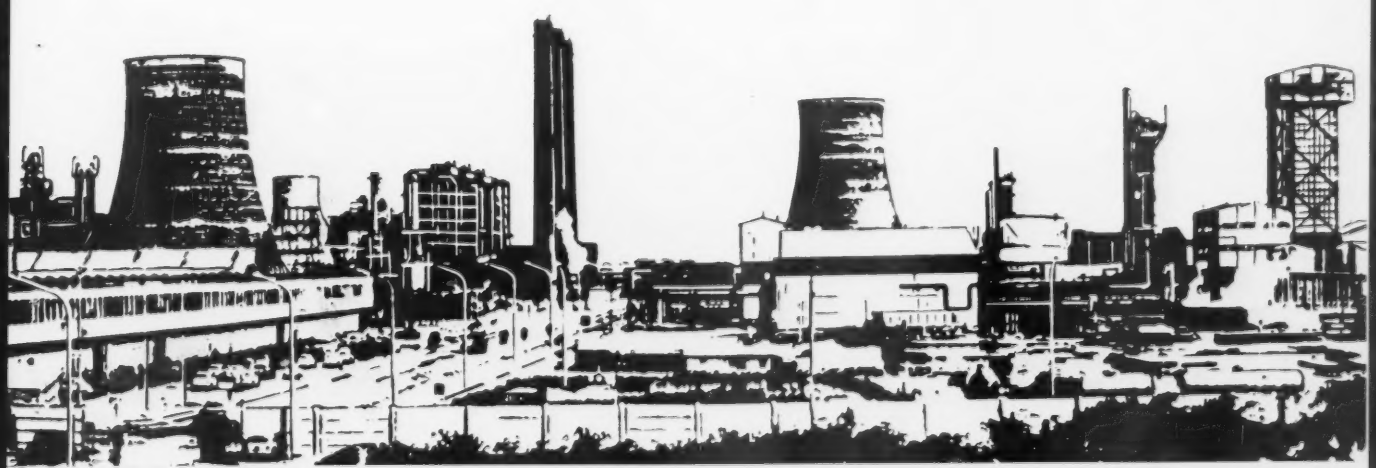
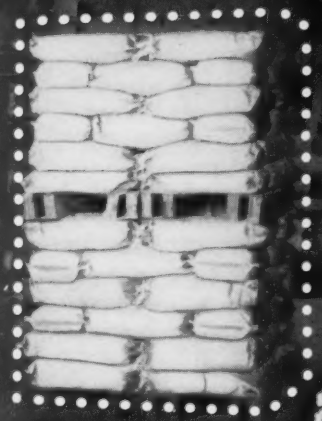


PROTOX®-267

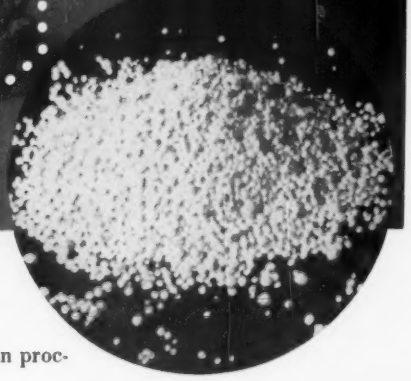
ZINC OXIDE

Two units on left contain 84 bags—
2.1 tons conventional zinc oxide.
(Each unit 6 bags per layer, 7 layers high.)

Two units on right contain 96 bags—
2.4 tons Protox-267 zinc oxide.
(Each unit 8 bags per layer, 6 layers high.)



It's pelleted!



It saves dollars!

You will save on unloading costs. You will save on storage costs. You will save on processing costs.

PROTOX-267 bulks about half that of conventional zinc oxides. A 50-pound bag occupies less than 1 cubic foot of space. It flows freely . . . can be weighed out faster. Long before the pigment enters your processing operation you can start counting your savings.

But the most important savings come from PROTOX-267's faster incorporation and dispersion in rubber. The unique coating* of zinc propionate on the pigment particles makes for rapid and thorough dispersion. There are no aggregates . . . no undispersed pigment . . . no spotty cures.

And keep in mind . . . PROTOX-267 is a member of the HORSE HEAD line of zinc oxides. That also makes it the *most uniform* zinc oxide you can buy.

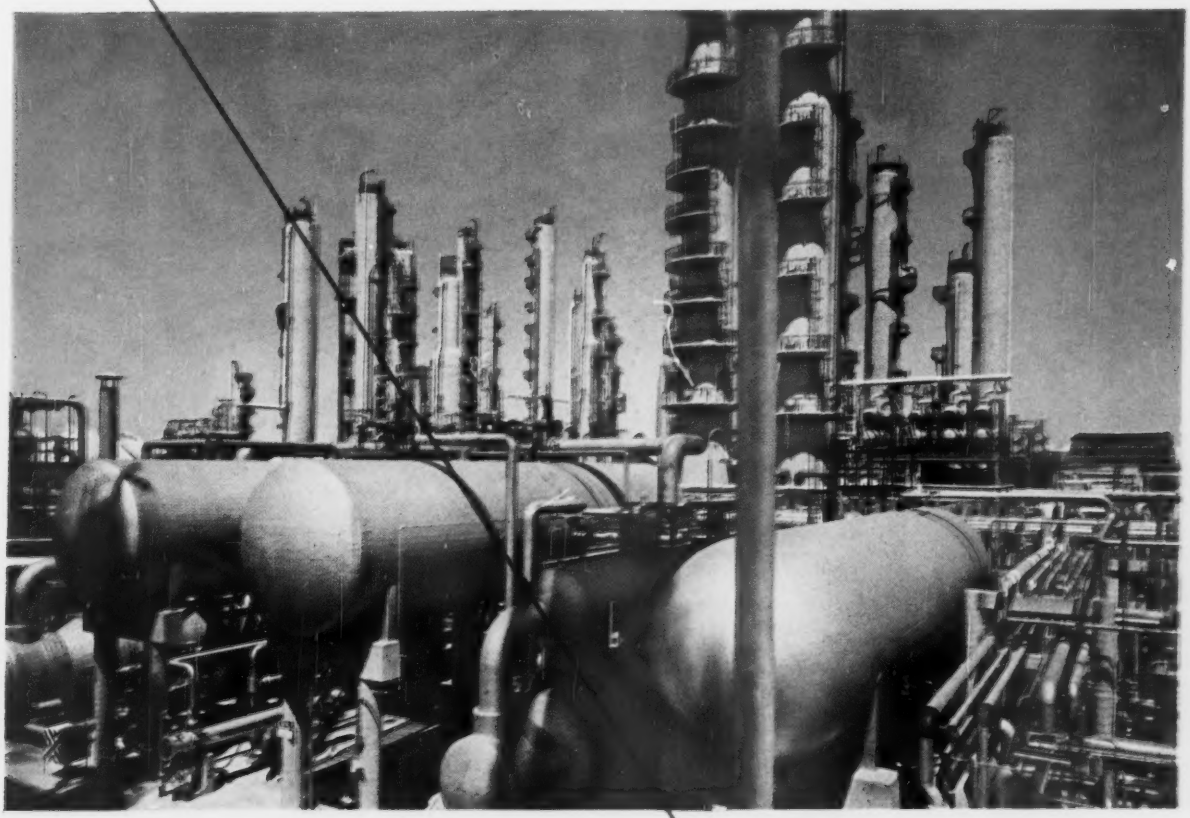
Do you have the 24-page booklet on PROTOX zinc oxides? It's chock-full of facts every rubber chemist and purchasing agent should know. A post card will bring you a copy.

U.S. Patent 2,303,330

THE NEW JERSEY ZINC COMPANY

160 Front Street • New York 38, N. Y.

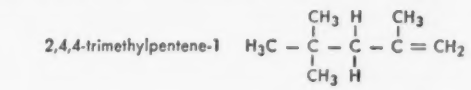
tank-car delivery of DIISOBUTYLENE



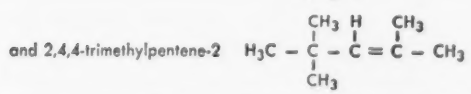
Now in its third successful year of volume production, this Petro-Tex trimethylpentene finds important use in detergent intermediates, anti-oxidants, etc. But its reaction possibilities—such as chlorination and hydrolosis to isooctenyl alcohol—are far from fully explored.

Petro-Tex Diisobutylene has a uniquely interesting combination of properties. It is a clear water-white mixture of

2,4,4-trimethylpentene-1



and 2,4,4-trimethylpentene-2



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To expedite end-product research, we offer a complete technical "package" containing detailed physical properties plus a breakdown of the isomer distribution and their concentration. Our technical personnel will work with you on new applications which may lead to volume use. We also invite inquiries for

TRIISOBUTYLENE **BUTADIENE**
ISOBUTYLENE **n-BUTENE-1** **n-BUTENE-2**

PETRO-TEX CHEMICAL CORPORATION

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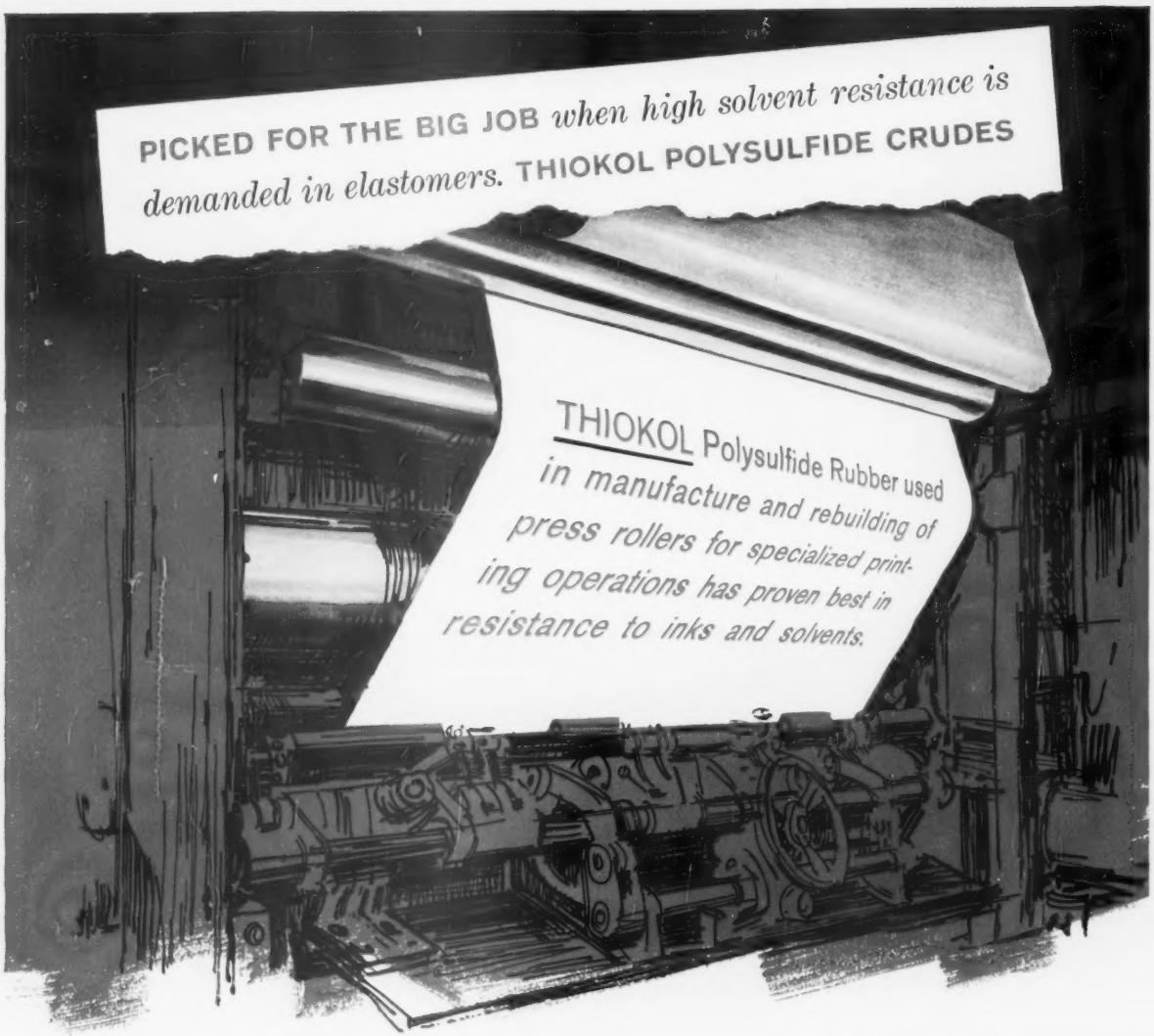
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THIOKOL Polysulfide Rubber used in manufacture and rebuilding of press rollers for specialized printing operations has proven best in resistance to inks and solvents.

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As Ken Soule Sees It

by Kenneth J. Soule

What Is IQF?

If you don't happen to know, at first glance, what the above initials stand for, you probably have plenty of company. However, in the frozen foods industry there is no question what IQF means: "Individual Quick Freezing." To explain a little further. Up until a relatively short time ago, the standard way of preparing and marketing frozen fruits and vegetables was by the so-called "block-frozen" method. This produced the familiar ten-ounce or larger package of frozen peas, carrots, broccoli, berries, or what-have-you. A most useful product for the harried housewife, but one which did not lend itself to removing a portion of the contents —except by thawing the entire block.

In the new IQF process—as explained in a *Bakelite Review* article (July, 1960), entitled "The New Look In Frozen Foods,"—the fruits and vegetables are frozen individually, rather than *en mass*. In fact, it is said that "each pea, bean, kernel of corn, strawberry (or other berry), is frozen by itself." The first and most basic result of this innovation is that the frozen product is completely free-flowing. Therefore, it can be packaged in a simple polyethylene bag, rather than in the present rather elaborate cardboard carton, with its overwrap of printed waxed paper.

The advocates of the new process make a number of claims for their method and its resulting product. First, since it is free flowing and is bag packed, it is very simple to remove as much or as little of the frozen material as desired. Also, since the packaging is in larger-sized-amounts than the present block packages, there should be economy in purchasing. Again, the use of a clear plastic container is supposed to permit the shopper to see what the product looks like before buying. Incidentally, if anyone is afraid that the frozen pellets will tend to punch through the walls of the thin plastic containers during handling or in multiple storage, they can stop worrying on that score. It is stated that Union Carbide Plastics Co. has already anticipated this problem, and has solved it completely with the development of a new series of resins. These are said to add greatly improved tensile and impact strength, while maintaining all the other virtues of standard film, and thus to produce the "toughest polyethylene film you can buy."

It is claimed that the free-flowing poly-packed products found wide acceptance in Australia and Canada before their introduction in the U. S. Within the past year they have also been favorably received in this country, with more and more packers from West to East gradually joining the parade.

Granting the merits claimed by the IQFers, there are a few questions which only time and the consuming public can answer. What about the obvious difficulty of trying to stack up a number of slipping, sliding bags in the freezer or freezing compartment of the refrigerator, compared with the ease and neatness of piling up any number of block-frozen packages. Poorly sealed packages are also a definite problem.

And how much interest will the housewife have in changing from a completely familiar product to a new and strange one—unless perchance she is "softened up" by a well planned advertising campaign.

I am not predicting or even trying to guess what the outcome will be. (It would be safer and probably easier to tackle our upcoming presidential election.) But on the outcome hinges the fate of a potential market for polyethylene or some other competitive film, which could easily top more than a million pounds per year. Almost worth fighting for!

Scrambled Rubber Goods

The mid-summer seizure by Cuba of the three large American owned rubber plants in that country poses some interesting problems along technical lines.

In the first place, almost all of the vitally important materials going into the make-up of the rubber goods produced there have always been shipped in from the United States. These include rubber (both natural and synthetic), carbon black, accelerators, antioxidants, curing agents, and fluxes—to name a few. Many of these items are in tight supply, particularly among the few possible sources from which the Cubans might be able to beg, borrow, or wangle any sizable amounts.

Another king-size problem regarding tires is the question of finding enough nylon or rayon cord to take care of the requirements for the 400,000 or so tires turned out yearly in the Cuban Firestone, Goodyear, and U. S. Rubber Co. plants. While it is true that Cuba does have a textile industry, tire cord has never been one of its production items and the chance of switching over from ordinary textiles to cord suitable for tires presents an almost unsurmountable problem. About like changing a lemon grove over to one producing oranges overnight. (Well, Fidel might say, "Textiles are textiles aren't they?" — Yes, and both lemons and oranges are citrus fruits, aren't they?) Another smaller stumbling block would be the difficulty of obtaining rayon or nylon fiber, even if it could be processed into cord after you had it on hand.

Besides tires, rubber footwear is a good-sized production item in Cuba. Here the problems are similar to those with tires, but somewhat less acute as regards the fabric body. However, as far as vital rubber chemicals, rubber, and curing materials are concerned, the basic dilemma is the same regardless of whether the product is tires, footwear, toys, hot water bottles, nipples or anything else. If you can't get the right raw materials, you struggle along with substitutes, if any are available. Finally—you close down.

Of course, when a dictator is breathing down your neck demanding production and more production, there are a few panic-button steps which you can take. One such step is to use *ersatz* fillers and impossibly weak fabric strength members. But, regardless of the severity

As Ken Soule Sees It (Cont'd)

of the crisis, no chemist, compounder, or engineer, can produce rubber goods of *any* kind—no matter how inferior in quality—without the proper curing materials.

We feel deeply sorry for our fellow technicians in the "expropriated" rubber factories, whether they be Cubans or Americans. For we can only foresee the gradual creaking to a halt of tire-less automobiles. Then there will be an eventual return to ox carts drawn by bare-footed (not rubber-shod) peons. Of course, for public consumption, America will be castigated for the debacle, but in Cuba, the local scientists and technical personnel will be in for rough times.

Air—Its Special Applications

Although the earth's atmosphere—or what we customarily call air—is usually taken pretty much for granted, a few specialized uses and applications may merit consideration.

One of these is the Curtiss-Wright free floating automobile, which in service, rides on a cushion of air a short distance above the roadway. The supporting air is piped down from the auto and kept from escaping too quickly by a skirt of rubber or plastic extending below the chassis, and completely surrounding it circumferentially.

Another air-supported vehicle is Ford's Levacar, which also finds air to be the ideal smoother-outer for ground travel and particularly for speeds over 150-200 miles per hour. Here the car is maintained only a few thousandths of an inch above the rail or other bearing surface. This is accomplished by the use of Levapads, which are flat plates with a hole in the center and an air supply directed down to produce an air film between the plate and its support. Smooth, vibrationless travel results.

A distinctly different use for air is visualized in planes now being built by the Northrop Corp., Hawthorne, Calif., for the U. S. Air Force. These are said to be of a radically new design, with slotted wings and tails. According to Northrop, turbulent air flowing over these surfaces would be sucked into the aircraft parts, thus reducing drag and increasing aerodynamic efficiency. Performance characteristics are claimed to be improved up to 80 per cent, as shown in wind tunnel experiments and preliminary tests with planes with partly slotted wings. High hopes are held out for the ultimate production of aircraft which could remain aloft for days at a time, through further developments along these lines.

To complete the land, air, sea cycle, we call attention to the novel use of air, as suggested during the recent shark scare along the Eastern seacoast of the United States. According to newspaper reports, it was demonstrated by the operators of an Asbury Park aquarium that their sharks refused to swim past a bubble curtain of air which had been put in operation in the large exhibition tank. This was arranged by hooking an air compressor to a perforated hose stretched across the bottom of the tank.

Following this lead, at least one hotel—the Stockton, at Sea Girt, N. J.—installed a similar line of perforated hose under water between two jetties on their private bathing beach. Here also an on-shore air compressor furnished the required air.

There are, of course, countless other ways in which air works wonders for our convenience, as well as our health and happiness. But, even from this miniscule sampling of current examples of the versatile use of air, it must be clear that this gas which surrounds and envelops us is really vital, and that it is probably here to stay!

Of course, on a real sticky August dog-day there are those who wearily complain, "There's just no air today." But we are confident that a galloping poll of even these dis-spirited individuals would agree overwhelmingly to give AIR a vote of confidence. . . . For in their heart of hearts, they really know that on the bad days the heat and the humidity are the real culprits, and not their tried and true friend, Mr. Air! . . .

For the Birds

When in graceful flight against an azure sky, the domestic pigeon presents a beautiful picture. This is no doubt one reason why the release of thousands of these birds at a given signal was a feature of the opening of the recent Olympic Games in Rome.

However, when large numbers of tame doves decide to hold summit conferences on lofty public buildings the situation is vastly different. Years ago such a problem hardly existed because the people who raised pigeons did not allow them to "run" wild. But now, what with population explosion and less personal restraint, hundreds of court houses, city halls, skyscrapers, and industrial structures are bedevilled by hordes of the *bill and cooers* sunning themselves, picking lice and endlessly discussing high level subjects. The building owners do not object to the continuous coo-ing, but when the bills keep piling in for cleaning up the pigeon debris and repairing the resulting structural damage, then relief has been sought by the use of a variety of devices devised to annoy the squatters.

Many have been unsuccessful, but two types apparently have worked well. One is the use of low voltage electric wiring, strung along the roosting areas. This evidently is quite complicated and expensive. For example, the New York City Board of Estimate has just appropriated $10,000 to so equip the facade of one of the new buildings at the American Museum of Natural History.

The other is a Zon Automatic Scarecrow made in the Netherlands and marketed in this country by B. M. Lawrence and Co., 244 California St., San Francisco, Calif. It is said to retail for about $60. According to articles in *Esso Oilways* (July and Sept., 1960), the device is about three feet long and portable. Through the use of a timer, a flint, piston, etc., a charge of acetylene gas is made to explode every few minutes on a pre-determined schedule. Esso, acting on advice from the U. S. Dept. of Interior, tried out the machine and found it completely satisfactory in their own pigeon war.

Our only wonder is—when these feathered delinquents are driven from one choice spot, how far do they go?—to another lofty spire—or back home (if they have one). No answer, but when interviewed by our roving reporter, one pouting pigeon said in precise pidgin-english, "No likee hot foot. No likee boom bang. We velly sad."

Rubber industry enters new era as

WORLD'S ONLY

Rubber industry enters new era as

WORLD'S ONLY COMMERCIAL SOURCE OF POLYISOPRENE BOOSTS PRODUCTION

Expanded

SHELL ISOPRENE RUBBER

facilities now on stream

Since the first commercial shipment of Shell Isoprene Rubber twenty months ago, over 3,000,000 lb. have been used by customers in the U. S. A. for evaluation in a wide variety of products.

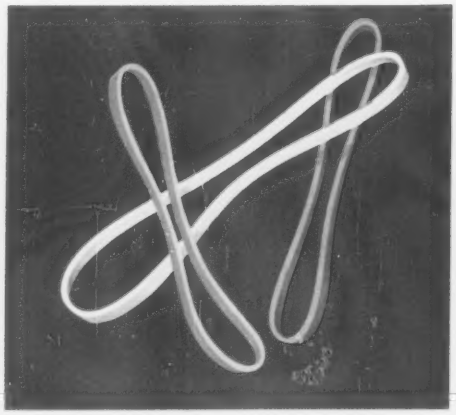
Today the expanded polyisoprene facilities at Torrance, California can supply over 3,000,000 lb. of Shell Isoprene Rubber *per month*. And ground will soon be broken for a new plant of twice this capacity in Midwestern U.S.A. Another plant is under construction at Pernis, Holland.

MORE →

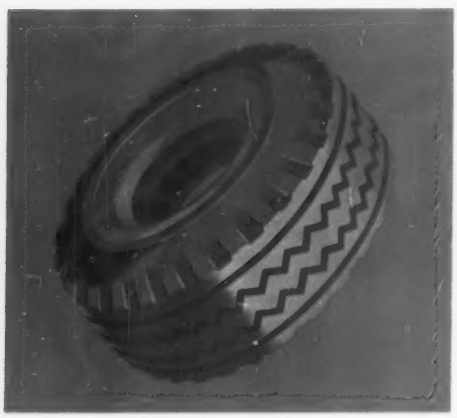
Here are some of the outstanding properties of

SHELL ISOPRENE RUBBER

IN MOLDED PRODUCTS . . . superior mold flow . . . improving detail, reducing rejects.



IN GUM STOCKS . . . light color, uniformity . . . especially important in light- and bright-colored products.



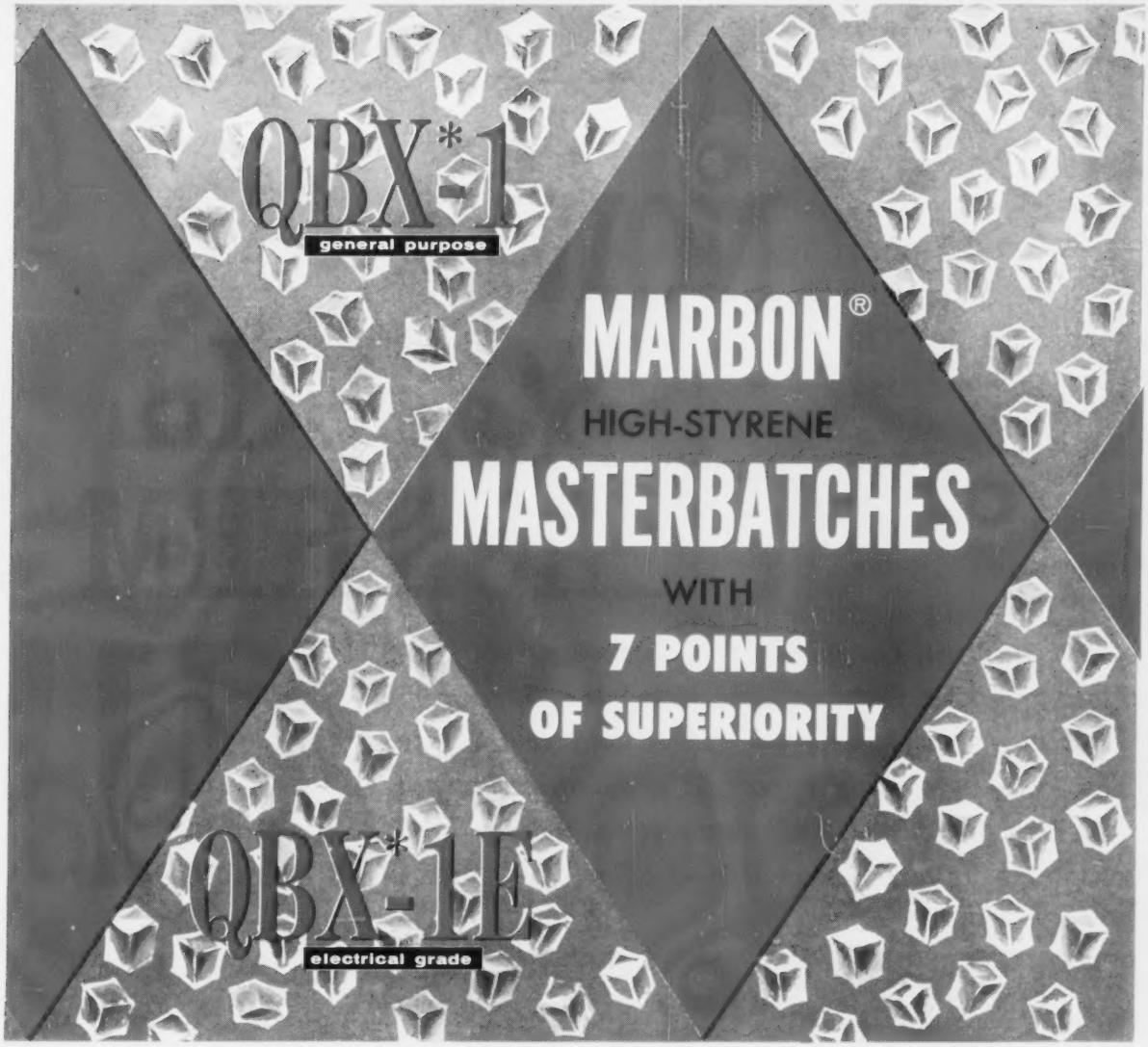
IN HEAVY-DUTY TIRES . . . low heat build-up, high resiliency and good mold flow . . . reducing blemishes and rejects.

IN PROOFED GOODS . . . flexibility, uniformity, excellent mold flow and high purity.

For more information about Shell Isoprene Rubber or any of Shell's other Cariflex polymers and latices, apply to your local Shell Company.

SHELL

Cariflex Trade Mark SHELL-MADE RUBBER



QBX-1 and QBX-1E, two new masterbatches from Marbon, are the most economical and efficient form of high-styrene resin reinforcement available today. Many of the time-consuming properties of less-efficient forms have been removed, with resultant increases in production and quality of end product. QBX-1 and QBX-1E, for general purpose and electrical grade, will meet and pass the most rigid tests. We will be happy to send you a sample for your own testing.

1. Uniform stacking and palletizing
2. Uniform diced 3/32" cubes
3. Faster, cleaner, more accurate weigh-up (for both manual and automatic weigh systems)
4. Excellent dispersion (specific masterbatching eliminated)
5. No need for exacting temperature control in mixing
6. Faster mixing cycles
7. Lower power requirements

*QBX is a trademark of BORG-WARNER CORP.

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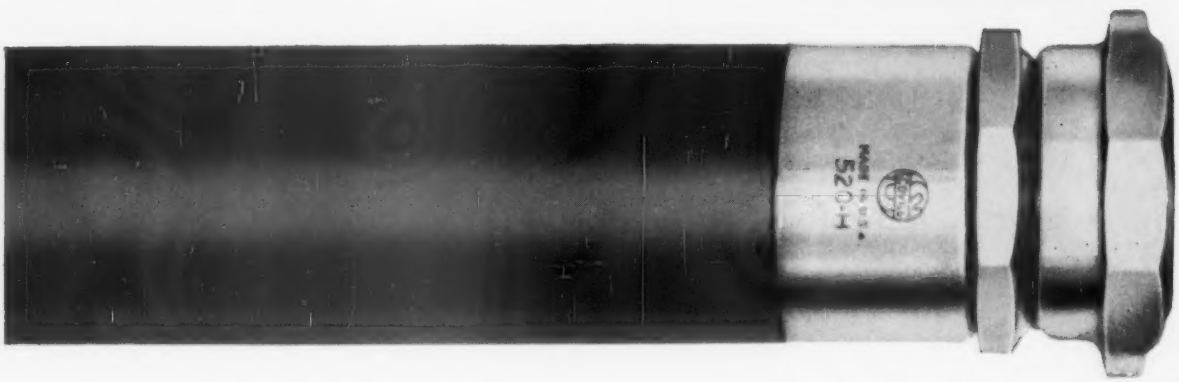
Announcement: On the first of September 1960, Scovill Manufacturing Company purchased the International Couplings, Inc. line of permanent and re-attachable hose couplings. This important acquisition has far-reaching benefits for all users of industrial hose couplings. It means Scovill now offers . . .



Specify Scovill Couplings! You select from the most complete line of fuel oil and gas pump couplings (permanent and re-attachable) in the industry today. You get fast, efficient service—coupling orders received by Scovill are shipped without delay from any of Scovill's nation-wide network of warehouse facilities. You get expert advice from the industry's largest —and finest—sales force. For complete details, write: Scovill Manufacturing Company, Industrial Couplings, Waterbury 20, Conn.

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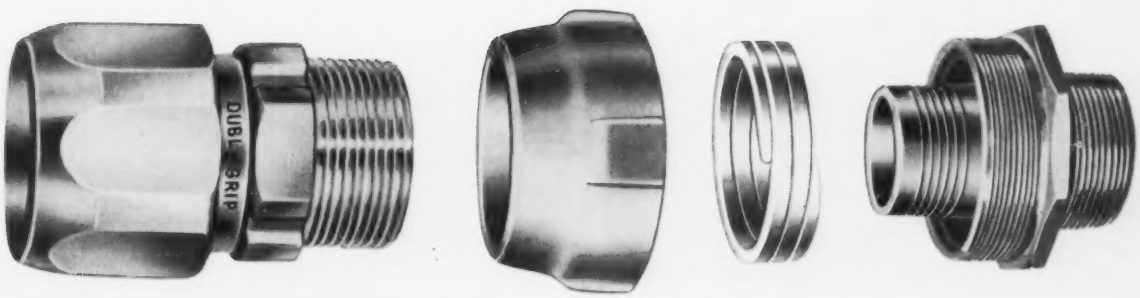

***!All** sizes in permanent and re-attachable hose couplings from 3/4" to 4"!*

***!All** the warehousing facilities needed for fast, efficient service anywhere in the U. S. and Canada!*

***!All** these well-known hose coupling trade names: Stream-Flo, Rib-Lox, Super-Grip, Dubl-Grip, Inter-Flo, Dubl-Guard—plus the famous Scovill line of 570-H and 520-H Couplings!*

Tensile strength is high

Ratio of natural rubber to SBR	Tensile Strength— 125 Part Loading		Tensile Strength— 150 Part Loading	
	Super Multifex	Multifex-MM	Super Multifex	Multifex-MM
50-50	2,400 psi	2,030 psi	2,110 psi	1,890 psi
25-75	2,440 psi	2,200 psi	2,120 psi	2,020 psi
0-100	2,140 psi	2,000 psi	2,000 psi	1,790 psi

Tear strength is high

Ratio of natural rubber to SBR	Tear Strength — 125 Part Loading		Tear Strength — 150 Part Loading	
	Super Multifex	Multifex-MM	Super Multifex	Multifex-MM
50-50	270 pit	240 pit	300 pit	225 pit
25-75	225 pit	200 pit	240 pit	200 pit
0-100	200 pit	175 pit	220 pit	200 pit

TENSILE—

up to 2,400 psi

TEAR—

up to 300 pit

with Super-Multifex® and Multifex-MM®

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Polymel DX-40 is a low Gravity (1.01) Plasticizing extending resin - - a modified type of styrene. It is highly dielectric

ITEM	A	B	C
SBR-1502	57.5		
HIGH STYRENE SBR-1507MB 50-50	85.		
POLYMEL DX-40	20	30	40
POLYMEL ACTISIL	1.5	1.5	1.5
ZEOLEX 23	60		
ZINC OXIDE	5		
SANTOCURE	2.		
L-60	1.		
D.O.T.G.	0.5		
STEARIC ACID	2.		
SULPHUR	2.5		
TOTALS	242.0	252.0	262.0

COMPOUNDS SHOWN

MIXED ON LABORATORY MILL WITH 6x12 INCH ROLLS. MOONEY SCORCHES @ 250° F. SMALL ROTOR.

COMP.	Δ5	Δ30
A	24 MIN.	27 MIN.
B	28 MIN.	32 MIN.
C	36 MIN.	39 MIN.

ACCELERATION HELD CONSTANT TO ILLUSTRATE SLIGHT RETARDATION OF POLYMEL DX-40.

CURE: MIN. @ 320° F.	3			6			9			12			15		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
SHORE HDNS.	90-88	90-89	89-87	91-90	91-90	90-89	91-90	91-90	90-89	91-90	91-90	90-89	91-90	91-90	90-89
M-100	676	649	639	694	652	613	660	621	598	672	631	596	679	604	588
M-200	913	838	819	934	857	797	886	828	787	899	825	773	899	794	774
M-300	1172	1061	1020	1185	1023	987	1131	1019	977	1133	1026	964	1128	995	970
M-400			1250		1338	1235		1291	1198	1420	1263	1192		1239	1180
TENSILE	1221	1172	1356	1338	1338	1346	1248	1340	1346	1430	1340	1290	1242	1280	1340
% ELONGATION	320	350	430	350	400	410	360	408	427	405	415	420	340	415	435
% PERMANENT SET	47½	55	75	60	62½	70	47½	62½	70	62½	60	70	55	60	70

ROSS FLEX 'A' CMPD 0.6 @ 43M; 0.9 @ 91M 'B' CMPD. 0.6 @ 43 M.; 0.9 @ 84 M 'C' CMPD. 0.6 @ 66M; 0.9 @ 120M.

AGED TESTS (24 HRS. @ 100° C. AIR OVEN)

SHORE HDNS.	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89
M-100	825	831	733	809	774	671	730	724	625	732	726	622	706	686	606
M-200	1103	1058	948	1063	1010	879	969	933	814	964	944	814	929	896	798
M-300			1168			1095	1218	1140	1009	1174	1170	1019	1150	1094	981
TENSILE	1202	1230	1294	1304	1240	1286	1262	1140	1176	1330	1216	1219	1150	1150	1168
% ELONGATION	235	247	340	280	260	350	320	300	357	320	320	383	300	315	370
% PERMANENT SET	30	30	57½	45	35	60	50	37½	55	55	37½	62½	35	35	55

ROSS FLEX 'A' CMPD. 0.6 @ 28M; 0.9 @ 45M
'B' CMPD. 0.6 @ 28M; 0.9 @ 35M
'C' CMPD. 0.6 @ 52M; 0.9 @ 99M.

FLEX SAMPLES CURED 10 @ 320°F IN 12 IRON MOULD

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PRICES:
5000 Lbs. and Up....14¾ Cents
Less Than 5000 Lbs....15¾ Cents
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capitol cues

BUSINESS WILL REMAIN ON AN EVEN KEEL for the rest of this year. Many analysts feel that current doubts about business only reflect the economy's recent dose of bad news: New orders are disappointing; home-building is near 1960's low; retail sales are barely keeping ahead of 1959's; corporate profits are actually lagging a lot behind year-ago figures; and some corporations are reportedly cutting future expansion plans as well as their inventory buying.

But, the economy has some strong underpinnings, too.
- Defense spending is rising and will continue to do so in the final months of 1960. Gains will be small but very helpful.
- Steel production, barely above the year's lows, will improve as the auto manufacturers step up their 1961-model buying.
- Easier money will spur activity in all lines and help most businesses. Lower interest rates will aid many small firms.
- Consumer buying of soft goods will keep rising, with incomes; the experts feel 1961 auto sales will beef up durables sales.

It's worth noting that auto prospects are brighter than some newspaper stories would indicate. Sales in recent months are ahead of 1959 and total 1960 sales will run about 6.7 million.

WHAT WILL 1961 BE LIKE? A sluggish year for U.S. business, over-all. That's the picture as top economists in government and industry now see it. They expect a short, mild first-half easing, with recovery starting quickly. However, analysts see nothing seriously wrong with the economy these days. They feel the American economy is basically strong and will be going through a breathing spell that will set the stage for a real surge in 1962 and 1963.

Here's where the economy will be losing steam as 1961 begins:
- Consumer spending, now the main business prop, will begin to slow down next Winter. After two years of heavy purchasing on credit, folks seem ready to save more of their earnings. The buying of consumer durables, such as autos, won't climb much.
- Inventory buying will slip further as the consumer cuts back. Businessmen are leery about holding stocks that are too big.
- Capital expenditures seem likely to top out in 1961, and then decline. Plant capacity seems adequate for present sales. The correction will be moderate, since recent excesses were few; this sort of slow-down is considered mild, even healthy.

THERE'LL BE SOME PLUSES IN THE PICTURE--it's important to keep this in perspective as the negative signs multiply. These positive factors will partially offset the contractions that are expected in 1961. For example, government outlays--mainly state and local but some federal, too--will be rising; gains may hit $8 billion. Home-building will pick up as the effects of easy money spread. And declines in income will be minimized by built-in stabilizers--social security and unemployment pay--as was the case in 1958.

You can see how mild the '61 dip will be from these estimates:
- Total output of goods and services--Gross National Product--will fall only 1% to 2%. This year, GNP will probably reach $505 billion. Next year, the figure may dip to $500 billion.

capitol cues (cont'd)

DEFENSE SPENDING WILL STEP UP SHARPLY, no matter who wins in November. The platforms of both the Democratic and Republican parties make this clear. The key questions now are how much more will be spent--for what and just when. Size of the increases will eventually be as much as $3 billion a year, say the party planners. Benefitting will be missiles, anti-missile defense, submarines, warning systems, transport planes and conventional arms. The step-up will take several years; by 1963, the economy will really be feeling effects of the rise.

PROSPECTS FOR THIS COUNTRY'S EXPORT TRADE are becoming much brighter. Since 1960 started, exports have been one of the few sectors of the economy to look good. Shipments of planes, copper and steel products, and cotton have all topped start-of-1960 expectations. Sales abroad will total $18.8 billion, as against 1959's $16.2 billion. (Last January's estimate was $18 billion.)

Imports to the U.S., however, are falling short of forecasts. Instead of $16 billion, the figure probably will be somewhere around $15.5 billion. The U.S. is buying less foreign steel, meat, and wool. As a result, the U.S. balance of trade will be $3.5 billion this year, as against $800 million in 1959.

INCREASES IN PRICES ARE STILL FAR FROM OVER, even though inflation is clearly on the wane. Rising wages and higher costs of many materials are still putting considerable pressure on some lines, though the push is much less than it has been. Here's what government experts see for some items:

Construction costs will continue to climb for some time yet. Competition, however, will limit increases to buyers. Wages, materials, and equipment are rising; only interest is down.
-New homes will cost more next year, perhaps 3% to 4% more.
-Industrial buildings will rise, too, by the same amount.
-Road projects will see bid prices drop as competition grows.
-Work on dams, irrigation, etc., may show some declines, but the easing in the coming year won't be as much as 1959's 5%.

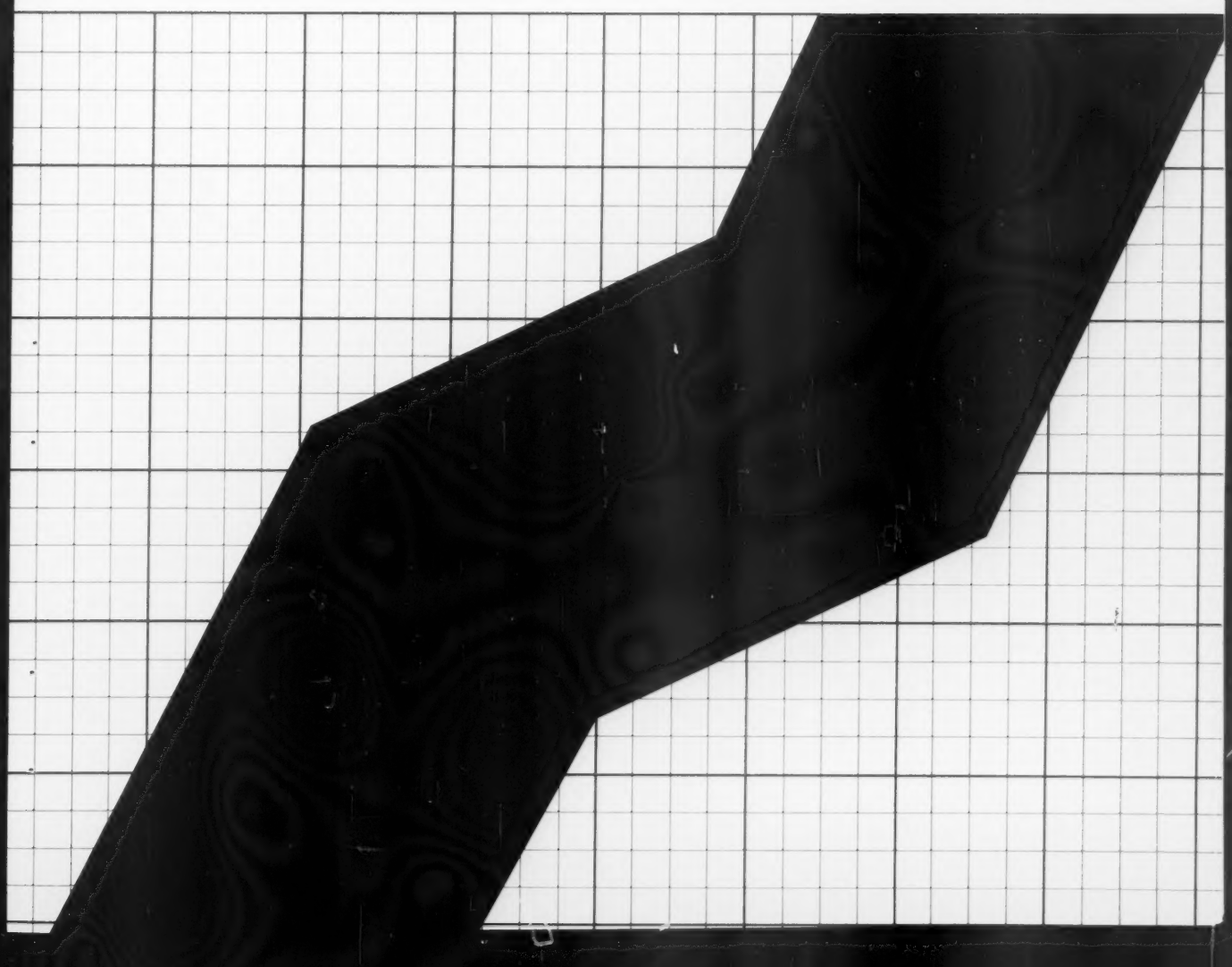
Prices of metals will hold their own or climb a little.
-Steel: Prices may go up in December, selectively, if use picks up. That's when a wage boost of 9¢ an hour will be taking effect. Mills absorbed a big hike early this year.
-Aluminum: U.S. experts see a ½¢ a pound increase in the base price. User stocks are low and demand is now rising.
-Copper: Current prices will hold despite the drop in use that's foreseen. The upset in the Congo is firming prices.

There'll be varying trends in consumer prices in the months ahead. Men's suits will rise $2.50 to $5.00; women's wear will go up,too, though relatively less. Shoe prices will hold steady. Meat prices will edge up, with pork rising most. Used car prices will decline and provide good buys.

HOW TO COMPLY WITH THE NEW LABOR DISCLOSURE LAW is spelled out by the Labor Department in a new 43-page Guide. It tells employers what information is required on financial dealings with employees, with unions, their agents, and with labor consultants. It also tells how to report such transactions. For a free copy, write the Labor Department, Washington 25. Ask for TAA No. 4.

Ameripol Micro-Black sales climb more than 1400% in just 18 months

Here's why...



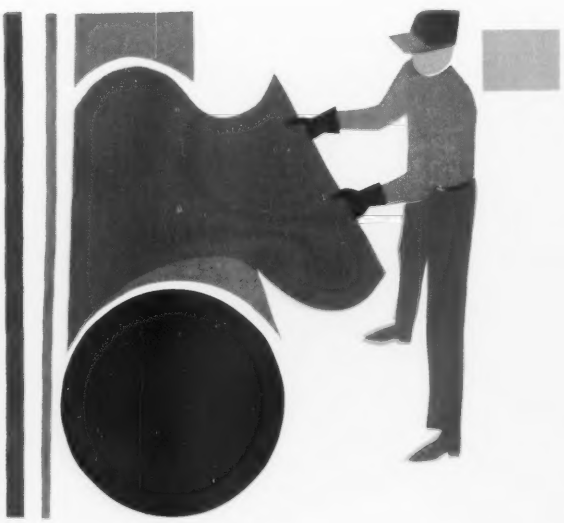
The facts behind the Micro-Black success story:

Users report 21 ways to improve rubber products, save time and money with Ameripol Micro-Black masterbatch

A little over two years ago, Goodrich-Gulf introduced a black masterbatch that was destined to revolutionize rubber processing. This product was Ameripol Micro-Black. And, it set a new standard in carbon black dispersion, made possible by an exclusive process —high liquid-shear agitation of latex and carbon black slurry.

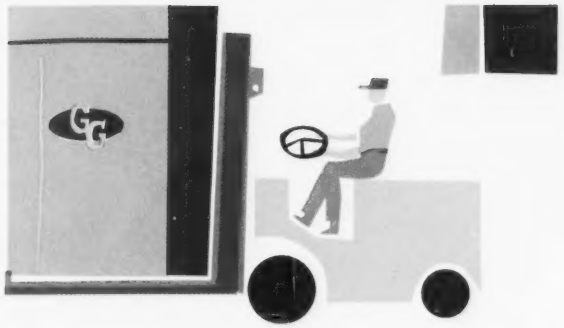
Micro-Black was tested by processors in a wide variety of product fields. And they came back for more. Proof: in the last 18 months alone—Ameripol Micro-Black sales are up 1400 per cent!

Now, here are the 21 ways Micro-Black has proven its ability to improve rubber products and save time and money:



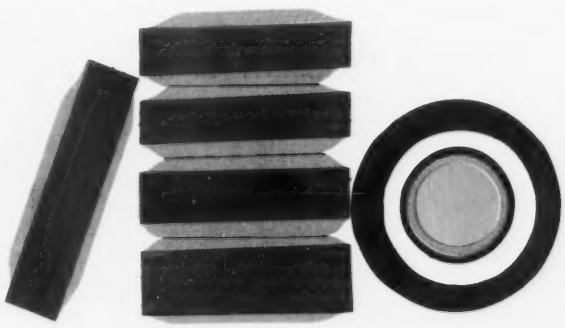
IN PRODUCTION, Ameripol Micro-Black . . .

1. Eliminates one weighing operation.
2. Eliminates one milling operation.
3. Shortens other mixing operations.
4. Releases mixing equipment for other uses.
5. Lowers power consumption.



IN STORAGE AND HANDLING,
Ameripol Micro-Black . . .

6. Is packaged in thirty-bale units for faster handling.
7. Does not cold flow.
8. Permits stocking a semi-processed material.
9. Is easy to warehouse.
10. Eliminates in-plant storage of carbon black.
11. Ends carbon black mess and clean-up expense.
12. Is readily available from two strategic shipping points.



IN THE END PRODUCT,
Ameripol Micro-Black . . .

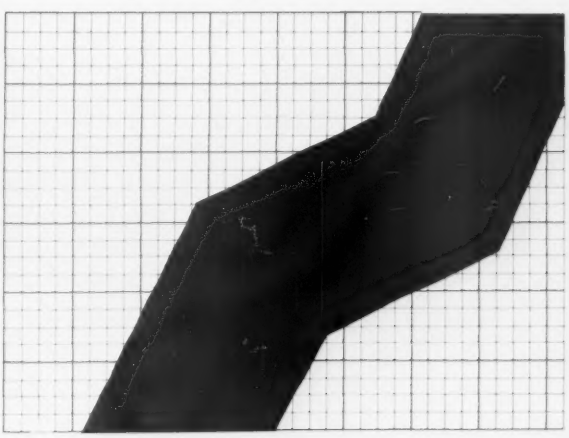
13. Assures thorough dispersion of carbon black in the rubber.
14. Provides a uniform standard of quality control.
15. Reduces the number of rejects.
16. Adds substantially to abrasion resistance.
17. Prevents damage to rubber as caused by high-viscosity milling.
18. Provides a stronger bond between rubber and carbon black.
19. Permits performance advantages to be added at no increase in cost.
20. Reduces heat build-up.
21. Provides a promotable quality feature.

Recheck these 21 points and see how Micro-Black can improve your operations

Remember, these are all proven advantages of Micro-Black. This superior masterbatch has met the test of time, both in the plant and in the market.

Ameripol Micro-Black is available to you from the largest synthetic rubber producing capacity in the world. In addition to plants at Port Neches, Texas, and Institute, West Virginia, Goodrich-Gulf maintains complete technical service facilities to assist you with production problems.

Turn the page for information on the full selection of Micro-Black polymers . . .



Goodrich-Gulf Chemicals, Inc.

Choose from this complete line of 16 Ameripol Micro-Blacks

COLD MICRO BLACK	BLACK		OIL		Emulsifier	Stabilizer
	Type	Parts	Type	Parts		
1605	FEF	50	—	—	FA	NS
4658	EPC	50	—	—	MA	NS
4659	HAF	52	HA	10	RA	ST
4651	HAF	62.5	HP	12	RA	ST
4660	ISAF	52	HA	10	RA	ST
4664	ISAF	52	HA	12.5	RA	ST
4667	SAF	40	HA	5	RA	ST

COLD, OIL MICRO-BLACK	BLACK		OIL		Emulsifier	Stabilizer
	Type	Parts	Type	Parts		
4760	SRF	75	N	17.5	MA	NS
1810	FEF	100	N	50	FA	NS
1805	HAF	75	N	37.5	FA	NS
1809	HAF	75	HA	37.5	MA	ST
4756	HAF	75	A	37.5	MA	ST
1808	HAF	75	HA	50	MA	ST
4759	ISAF	75	A	37.5	MA	ST
4758	ISAF	82.5	HA	62.5	MA	ST
4761	SAF	65	A	37.5	MA	ST

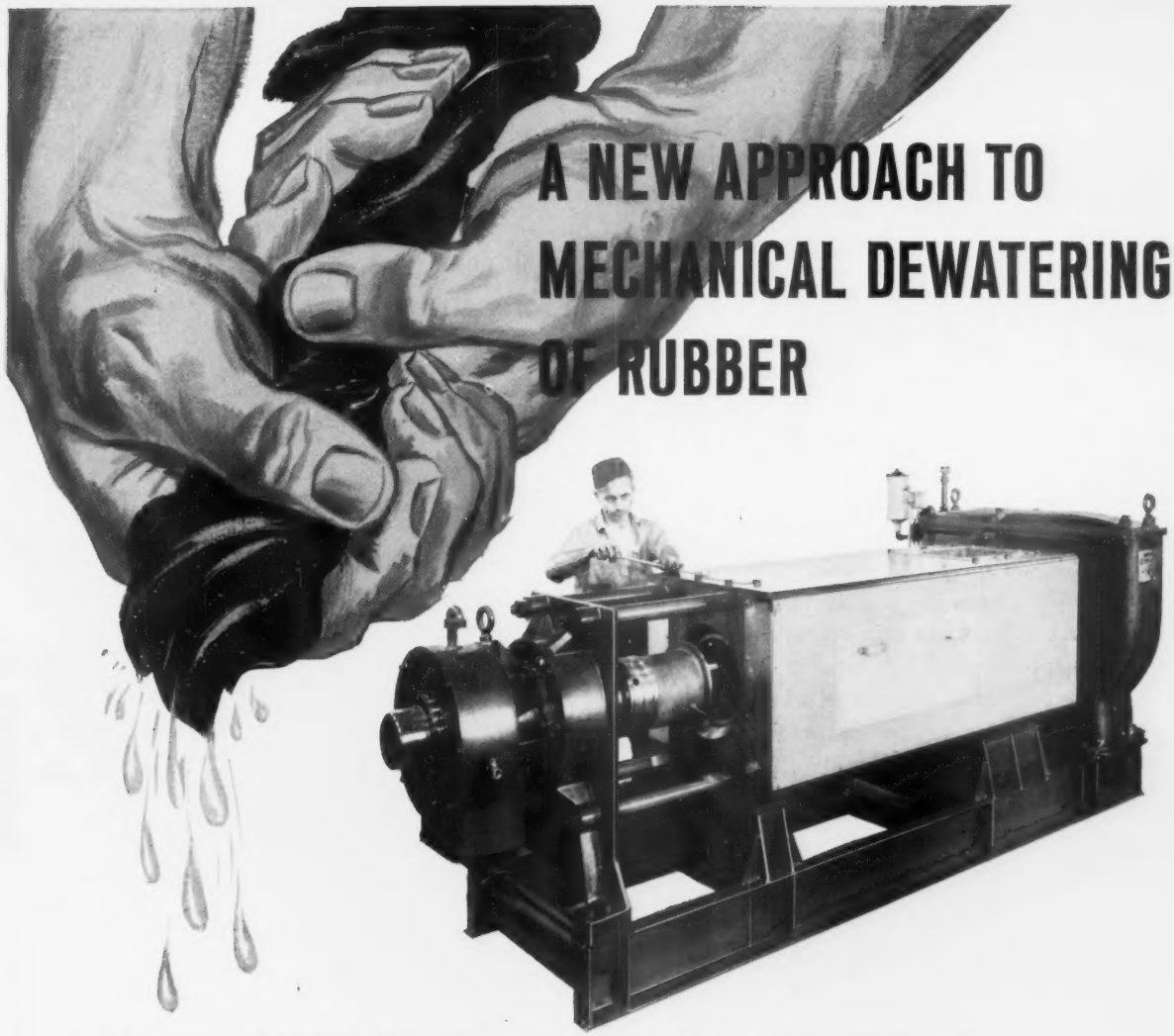
How to put Micro-Black to work in your operation

Call your Goodrich-Gulf Sales Engineer. He'll come to your plant and help determine the right recipe and proper grade of Micro-Black to fit your needs. He'll help you test it, with the full cooperation of the Goodrich-Gulf Technical Sales Service Laboratory.

When you deal with Goodrich-Gulf, you can draw on the production and technical resources of the leader in the field. Call or write us at 1717 East Ninth Street, Cleveland 14, Ohio. Plants at Port Neches, Texas, and Institute, West Virginia.

Goodrich-Gulf Chemicals, Inc.

THE ONE TO WATCH FOR NEW DEVELOPMENTS



A NEW APPROACH TO MECHANICAL DEWATERING OF RUBBER

EXPELLER* DEWATERING PROCESS

Mechanical dewatering of rubber by the new Expeller process has aroused the interest of many rubber companies. Following years of research the process has now been industrially accepted and in use for over a year. In fact, major companies are now using a number of these Expellers, preceeding dryers, to take moisture in crumb from 65% to as low as 8%. In actual use, the capacity of drying equipment can be increased two to four times when preceded by an Anderson Expeller. Based on such performance, each of these companies have ordered additional units.

EXPELLER DEWATERING HAS THESE ADVANTAGES

- Increases Drying Capacity
- Agglomerates Minute Crumb particles
- Improves Carbon Dispersion
- Saves on Drying Equipment
- Reduces Dryer Dust
- Dewaters all Types of Natural or Synthetic Rubber

A Pilot Plant in the Anderson Laboratory has dewatered almost every type of synthetic and natural rubber by this Expeller process with excellent results. These data are available to rubber companies. Pilot Plant demonstrations on your product can be arranged.

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We are processing (type of synthetic or natural rubber)_____

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Company Name _____

Address _____ *City* _____ *State* _____

THE V. D. ANDERSON COMPANY
Division of International Basic Economy Corporation
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RUBBER TRENDS

by The Economist Intelligence Unit, Ltd.

RUBBER TRENDS is a quarterly bulletin for all those concerned with rubber, whether as a manufacturer, dealer or producer. The bulletin provides regular analysis of the main factors affecting the supply and consumption of both natural and synthetic rubber. **It does not duplicate information already available elsewhere; the emphasis throughout is on long term studies of rubber trends.**

RUBBER TRENDS is prepared and edited in London by *The Economist Intelligence Unit, Ltd.* Analysis and research in London are supplemented by reports from expert correspondents in the world's key consuming and producing areas. Associated with the famed London "Economist" the EIU is the largest international business and industrial research firm of its size and reputation serving major world markets.

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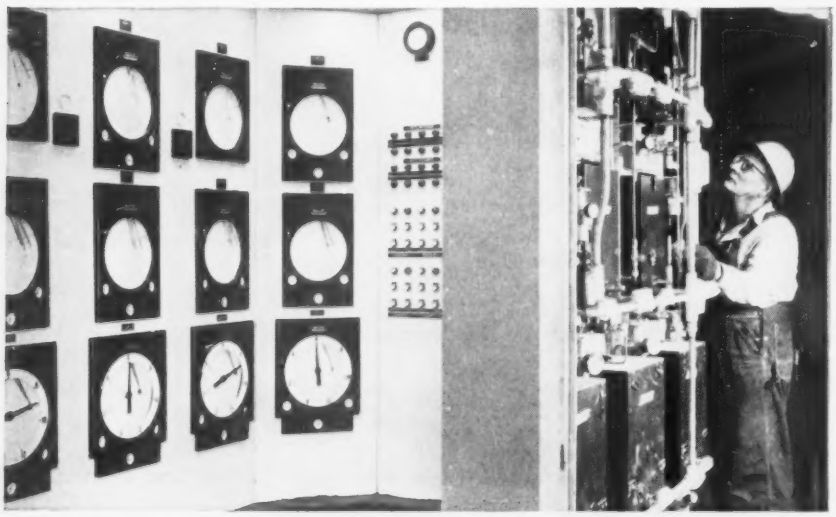
Furthermore, because Witco laboratories are located at plant sites, immediate testing results in faster production schedules. So, when you purchase carbon blacks, be sure you insist on highest quality—insist on WITCO-CONTINENTAL.



Centralized instrument panels, part of the fully instrumented production controls in use at Witco-Continental, record the continuous operating conditions in the plant. Temperature control points, recorders and automatic alarm systems evaluate and control conditions to assure a constantly uniform product. Start-up and shutdown for cleaning operations are push-button procedures.

Feed stock meters critically control hydrocarbon feed... play a vital part in the achievement of uniformity of black properties. Here, an operator conducts a routine inspection.

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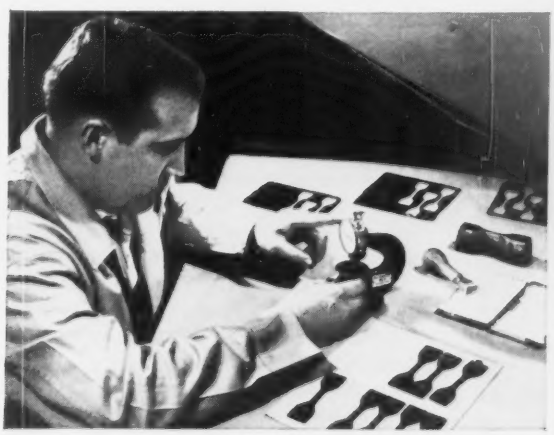

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Overseas

Rotterdam—The new Shell butadiene-styrene rubber plant at Pernis, which was officially opened on June 24, is the first Shell plant for the manufacture of synthetic rubber to be located outside of the United States. The Netherlands plant occupies 42 acres, is designed for a production capacity of 60,000 tons a year and represents an investment of £10 million. It is operated by Shell Nederland Chemische Fabrieken NV. The plant is composed of three units which are controlled from central panels and are almost completely automatic in operation. Included are a butadiene plant, a styrene plant and a co-polymerization plant.

Tokyo—Japan Synthetic Rubber has cut butadiene-styrene rubber prices by $5 per ton to $550, with further price slashes a possibility. The reason for the cuts is that imports arriving in the Kansai area are selling at $530 per ton.

Milan—Shareholders of Montecatini Mining and Chemical Co., Ltd., have approved the merger of Vetrocoke Co. into Montecatini. At the same time they approved a 50 per cent increase in the company's capital stock from 100 billion lira to 150 billion lira, representing an increase in authorized capital of 50 million shares of par value of 1,000 lira each.

New Delhi—The Indian government has decided on an eight year plantation plan, to cost 2.7 million rupees, to assist the Madras Forest Department in an attempt to grow rubber. Out of about 40,000 acres available within the reserve forest area, not more than 3,500 were found to have been suitable for the project.

Tel Aviv—Israel will export $2.5 million (United States currency) worth of tires, inner tubes and tire armor for vehicles to Turkey under the terms of a trade agreement.

Warsaw—Total quotas of £100,000 have been set on import of tires and tubes, and on import of various other rubber goods, including covered and uncovered rubber thread, rubber belting and rubberized fabrics, according to agreements reached in trade talks with the United Kingdom. Poland has indicated it will make special arrangements for fire resistant belting and synthetic rubbers.

Barcelona-San Andres—The Spanish company, J. Condina Villalonga, has been granted a license to manufacture, use and sell resilient shoe soles under the patents and trademarks of the Ripple Sole Corp. Manufacture of the molds necessary to produce the product will begin immediately.

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A is for Avoiding heat buildup

Cool off with Philblack A! With this easy processing black in the recipe, tires dissipate heat . . . take a tremendous amount of bending and flexing . . . withstand today's tough driving conditions.

And low heat buildup is just one of the benefits tire manufacturers get with Philblack A. Next time your Phillips technical representative calls on you, he'll be glad to tell you about each Philblack and its special advantages. Phone and ask him to drop in soon.

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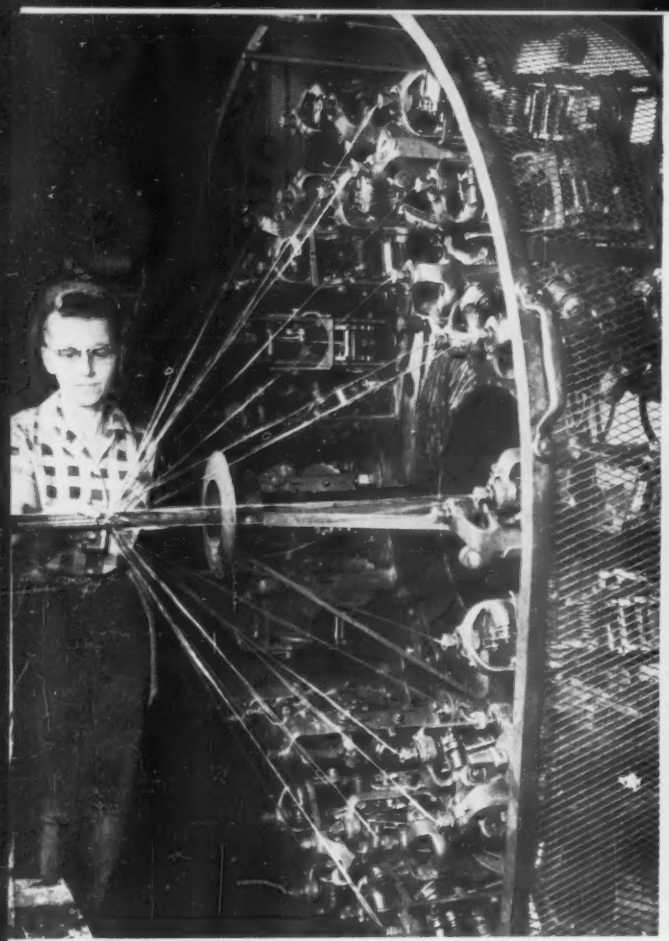
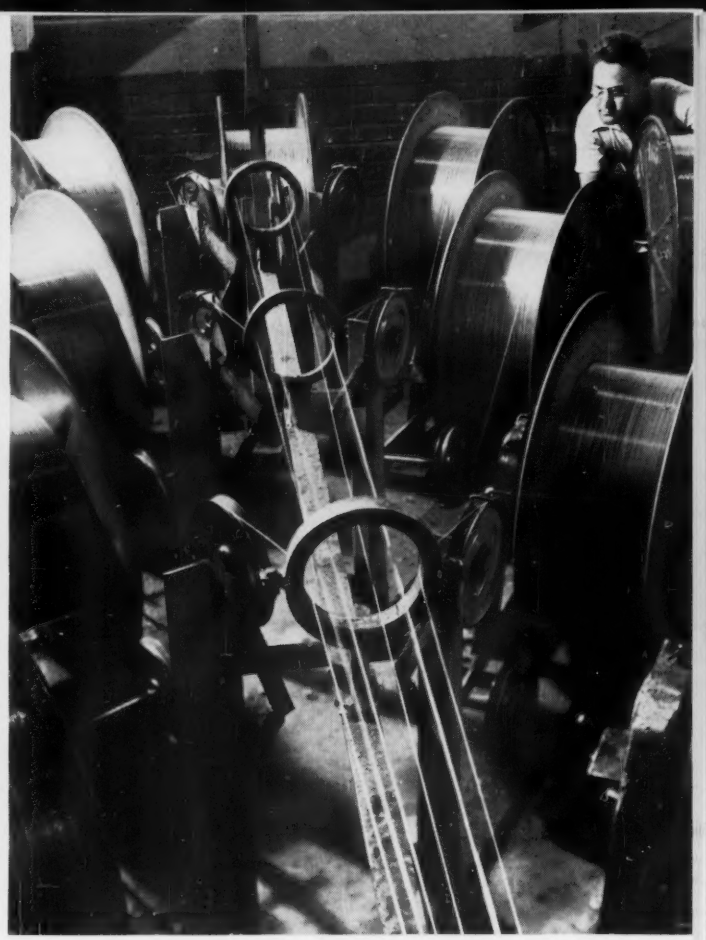


B. F. Goodrich Company braids multiple strands of steel wire into intricate sinews around rubber tube to help control and resist tremendous internal pressures required of flexible hydraulic hose. Wire such as supplied by Johnson has tensile strengths ranging from 240,000 to 400,000 psi.



Firestone Tire and Rubber Company uses only high tensile steel wire of exacting tolerances in building tire beads. Rapidly entering the bead machine in parallel —three to fifteen wires wide, depending on strength specified—the wires are coated with rubber. Clean bronze finish on Johnson wire assures proper rubber adhesion.

The best names in rubber use Johnson wire for strength and safety in tires and hose

The rubber industry has a sound reputation for producing quality products in advance of its needs by use of imaginative research—painstaking development of production methods—careful selection and testing of component materials.

Goodyear—Firestone—U.S. Rubber—B. F. Goodrich—Thermoid and others have established their names over the years by giving the general public and industry alike—strength, safety and durability in products such as long lasting pneumatic tires and tough pressure hose.

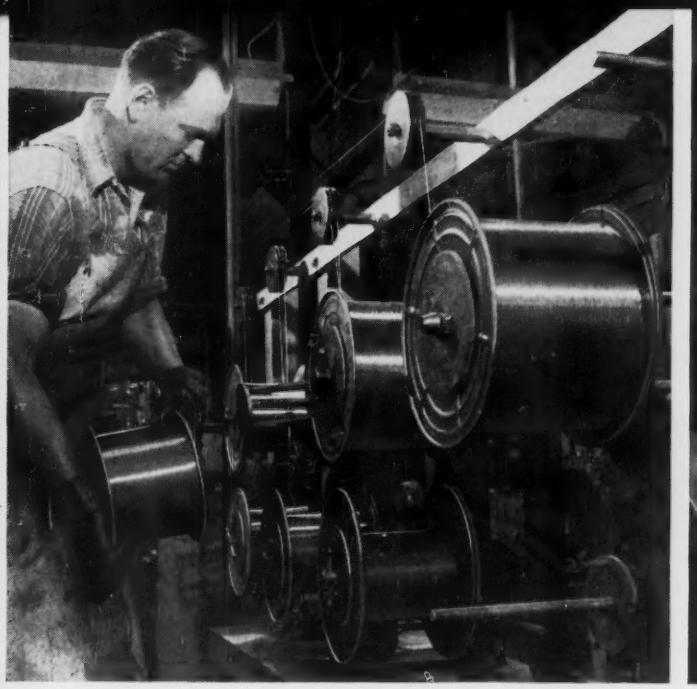
These two products owe their strength in part to the fine steel wires hidden inside them. For it is high-carbon steel bead wire which gives a pneumatic rubber tire—no matter what its size or job, the strength demanded by modern vehicles. Similar wire gives pressure hose its strong sinews which enable it to withstand working pressures as high as 10,000 psi—bursting strength may be three to four times as great.

Take the case of tire bead wire which Johnson supplies to every major tire manufacturer in the country. It is precision-drawn from special high-carbon rods to .037″ in diameter with a tolerance of only .002″—so fine that a 750-pound reel contains 39 miles of wire. Yet, a single strand exceeds 290 pounds of breaking strength equal to a tensile strength of 270,000 psi.

Also the wire must present a clean, unbroken surface and have a good and uniform bronze finish. This finish makes possible tight adhesion between the wire and the rubber surrounding it.

All these qualities contribute to the tire bead strength, help assure the safety of those who ride for work or pleasure on pneumatic tires.

Another special wire made by Johnson for the rubber industry helps rubber hose contain enormous pressures demanded by modern industrial applications. This reinforcing wire is drawn from selected high-



Thermoid Division, H. K. Porter Company, has cut wire rewind loss to ½ of 1% by use of Johnson Discard-a-Spool which eliminates overlaps and tangles, protects wire quality in shipment. The one-way disposable spool weighs only 28 ounces vs 200 ounces for standard spool—slashes tare weight 14 times.

United States Rubber Company wires tires for strength on this bead building machine. The strength comes from the steel wire bead in the edge of each tire. Johnson makes special high-carbon steel wire—.037″ in diameter with tolerance of only .002″ for U.S. and other major tire companies.

carbon steel in diameters ranging from .008″ to .020″ and has exceptional dimensional accuracy—tolerance is plus or minus .0005″.

Johnson hose reinforcement wire is supplied with a special liquor finish to provide maximum adhesion of steel to the rubber which fills the interstices between braids.

The wire is uniformly cast to make possible even spooling and has uniform tensile strength to prevent breaking under the working tension.

These excellent wire qualities, plus careful packaging and prompt delivery, have resulted in Johnson becoming a prime supplier to the rubber industry for hose reinforcement wire.

The outstanding performance of Johnson wire in the rubber industry is typical of the experience in other industries where Johnson supplies aircraft cord wire, armature binding wire, wire for brushes, metal stitching, preformed staple wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire in a wide variety of sizes and finishes.

If you use specialty wires, call one of the offices listed to right and explore the advantages of Johnson quality which combines strength with economy.

The Goodyear Tire & Rubber Company finds that Johnson meets their exacting requirements for tire bead wire which has high tensile strength, twisting strength, elongation and special surface finish. Here parallel tire bead wires uncoil evenly into a bead building machine.

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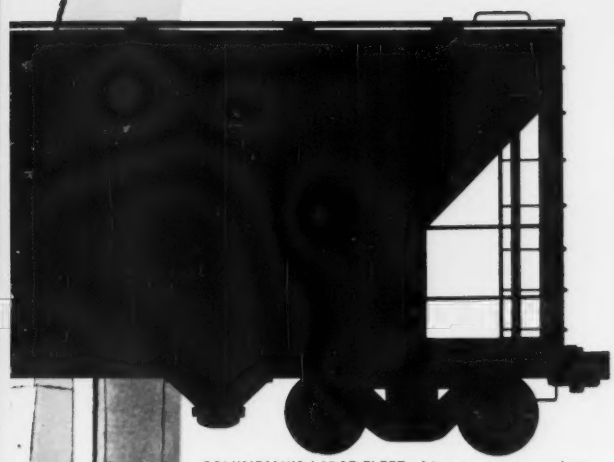

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COLUMBIAN has developed many new money-saving ideas for shipping carbon blacks . . . providing product protection and convenience.

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The development of better packaging and shipping techniques for carbon blacks is a vital — and unceasing — activity at Columbian. Results? Easier handling, product protection, convenience. Columbian provides not only outstanding products . . . but gets them to you in the best way — for your use. Ask for details . . . now!

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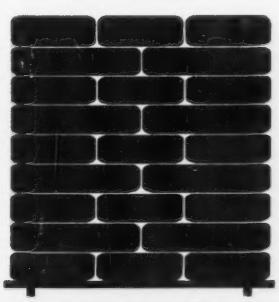

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STATEX M FEF Fast Extruding Furnace
STATEX 93 HMF High Modulus Furnace
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- **Eliminates Pattern Tracing** . . . Hytronic die cutting machines save pattern tracing time . . . Die duplicates pattern shape every time, eliminates possibility of error.
- **Power and Smoothness** . . . The speed of electronics and the power and smoothness of hydraulics mean fast one-stroke cutting that's easy to control . . . simple to operate.
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- **Versatility of Die Heights** . . . Built-in versatility of the Hytronic cutting machine eliminates beam adjustment for varying die heights . . . speeds your production when switching from high to low die heights.
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USO-81

News in Brief

► American Cyanamid Co., New York, N. Y., is offering looseleaf information on a new resin, Cyanocel chemically modified cellulose, which is said to have an extremely high dielectric constant coupled with a very low dissipation factor.

► The Blue Ribbon Mining Award has been presented to the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., for its development of two conveyor belts, the Wedlock Splice and the Heavy Duty Conveyor Belt for 45° idlers.

► Vol. 9, No. 4 of *Rubber Chem Lines*, prepared by the Rubber Chemicals Department of American Cyanamid Co., Bound Brook, N. J., stresses Pepton 65, a non-staining catalytic plasticizer effective at low mastication temperatures usually encountered on open mills. Vol. 9, No. 2 introduces ZMBT, a new rubber accelerator.

► A new bulletin on Zeolex 23, designed to replace pages RC-12 through RC-21 in the Huber Rubber Products Manual, has been issued by J. M. Huber Corp., New York, N. Y. It covers physical and chemical properties. Other pages are available on: "Huber Calcined Clays for the Rubber Industry"; "Gel Formation in Styrene-Butadiene Rubbers"; and "The Structure of Dispersed Carbon Blacks."

► Available from B. F. Goodrich Chemical Co., Cleveland, Ohio, are: a booklet on "Carboxylic Elastomers," by H. P. Brown of the B. F. Goodrich Research Center, reprinted from *Rubber Chemistry and Technology;* Hycar Technical Newsletter, Vol. IX, No. 1, which discusses several compounds; and a brochure entitled "Hycar Rubber and Latex" covering different types and their applications.

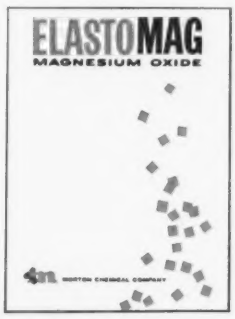
► Seiberling Rubber Co., Akron, Ohio has been awarded a citation for "outstanding service" to the U.S. Government by the Department of Commerce for the company's participation in official overseas exhibits sponsored by the department.

An index to Volume 87 of RUBBER AGE will be found on pages 183 to 186 of this issue.

ELASTOMAG
MAGNESIUM OXIDE

Three activity grades give you ideal process safety for every type of recipe

Cut down on costly throw-away loss caused by scorch. Get better bin stability . . . better states of cure by using an *activity-controlled* ELASTOMAG oxide from Morton. Three precision activity grades of ELASTOMAG—170 (high), 100 (medium), and 20 (low)—let you choose the oxide with a Morton Activity Index (MAI) that's ideal for every stock. New ELASTOMAG Micro-Pellets eliminate dusting problems. No binder or treating agent is used. In the mixer, Micro-Pellets break down to minute particles . . . provide the same superior dispersion as ELASTOMAG in the powdered form.



Get new ELASTOMAG Bulletin that summarizes tests on Neoprenes, Hypalon, and Fluoroelastomers. See how you can increase production with a new ELASTOMAG oxide. Ask your Morton Man for a copy now. Phone or write distributors below.

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SILICONE NEWS from Dow Corning

New Process Aid

SYL-OFF Coated Papers Speed Rubber Processing

In processing sticky rubber materials, "stickers" can cause lost time and extra cost. They can, but don't . . . if you specify interleaving or process papers with the new stickproof Syl-off® silicone coatings. Syl-off coated papers give quick, easy and complete removal of sticky products, help keep production moving smoothly, hold product waste to a minimum.

AIDS PACKAGING, TOO. Syl-off coated paper and paperboard are gaining rapid acceptance for use in packaging sticky products . . . from asphalt to sweet rolls, from adhesive masses to candied fruits. Standard containers available with Syl-off coated liners or inner surfaces include multiwall bags, fiber drums, unit containers, cores and cartons.

MORE ADVANTAGES. Syl-off coatings have natural nonoily lubricity and water repellency . . . won't migrate, contaminate or transfer . . . won't alter the characteristics of paper stock. Whether you process, ship or receive sticky materials, Syl-off coated papers are worth looking into. Write for a descriptive brochure and a complete list of sources for Syl-off coated paper. Address Dept. 7810.

For complete technical information about any silicone product, contact the Dow Corning office nearest you.

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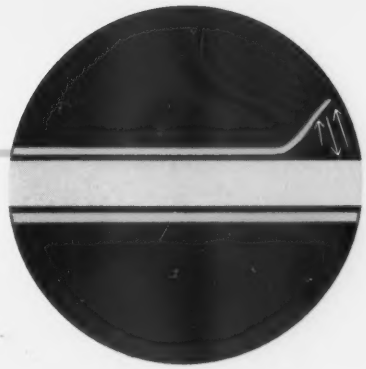
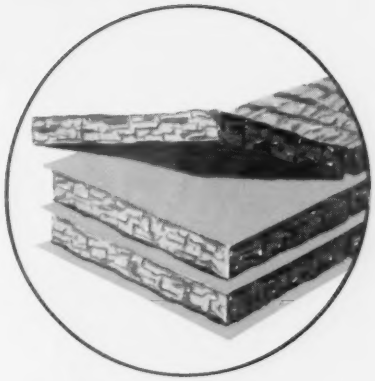
Solving unusual problems with Riegel papers



Stop rubber sticking with



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Strip-Ease . . . a new separating and interleaving paper coated with a remarkable new silicone that simply won't stick to tacky rubber and plastic compounds . . . now solves your sticky problems *at the cost of paper*. Gives you real savings over the cost of cloth, heavy plastic films and other types of coated liners.

Strip-Ease is so durable you can use it over and over again in many applications. Highly resistant to moisture and heat. Low stretch and free from cockle. Coating won't migrate or transfer and the escape of gases during rubber cure is facilitated. Smooth matte surface imparts nice finish and most rubber items require no talcing.

A few rubber applications: a separating and curing paper on wind-up of proofed products; a separating and interleaving paper; a wrapper and carton liner; a calendering base and curing paper for sheet stock. Other possible uses: for handling pitches, asphalts, waxes, adhesive masses.

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What can a pinch of permanence do for your adhesive formulation?

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For many adhesives producers, the pinch of permanence has led to striking advances in adhesives. It has opened the door to new applications, has helped leading formulators develop new markets.

For you, this pinch of permanence—the right phenolic resin—may well be the answer you seek to problems of film strength, tack, resistance to heat or moisture, flexibility or hardness, and many other qualities of the adhesive.

If you haven't looked into phenolics lately, you may be impressed when you do. A lot has happened in the past five years. At Durez, a lot is happening right now. New resins are coming out of the lab every week. One of them may be just what you need.

See an opportunity here? Let us help you take advantage of it. For more information on Durez resins for adhesives, just drop us a note outlining the properties you're after.

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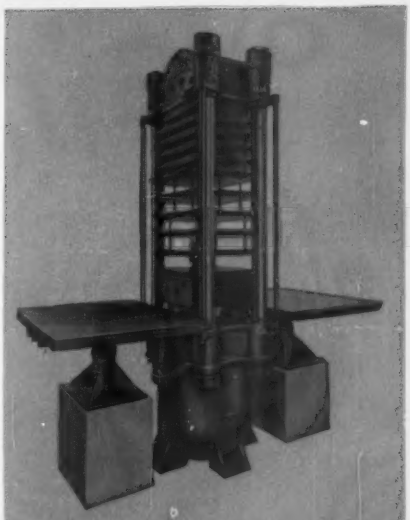
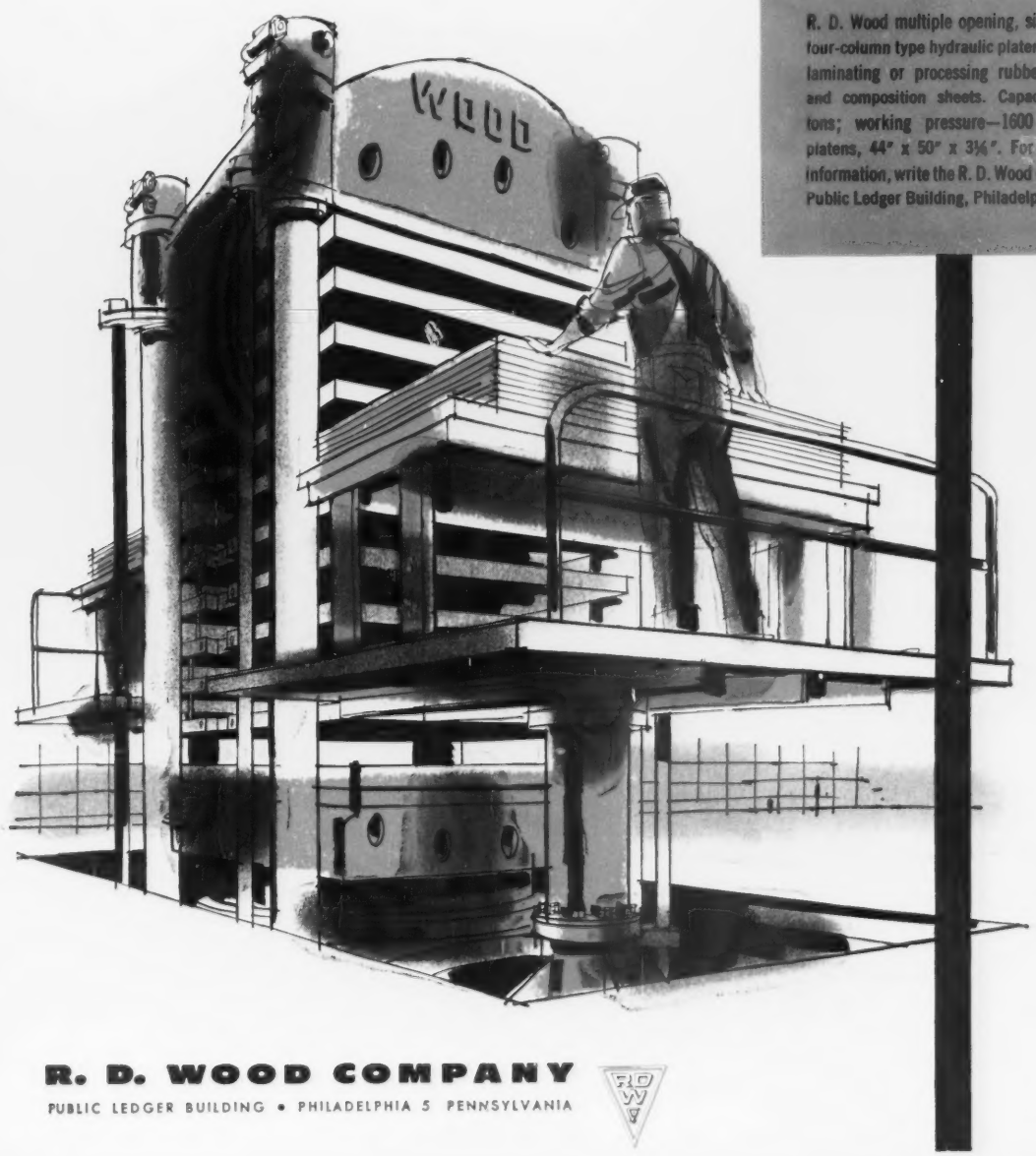
When you look at a new R. D. Wood press, you find every recent advance in press control and operation to meet the needs of today's automated production techniques. Yet there has been no sacrifice in basic design strength and rigidity so important to maintain continuous production runs. For example: the original model of the press shown below was built 25 years ago and is still in full operation. If you bought a Wood Press today, you'd receive the same fine quality which provides longer life . . . less maintenance. This is the type of service you expect when you buy a Wood Press.



R. D. Wood multiple opening, single ram, four-column type hydraulic platen press for laminating or processing rubber, plastic and composition sheets. Capacity—1200 tons; working pressure—1600 psi; 11 platens, 44" x 50" x 3½". For complete information, write the R. D. Wood Company, Public Ledger Building, Philadelphia 5, Pa.



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SYNPOL 8201 is a highly oil-extended SBR polymer that *continues* to prove both its performance and its *cost* advantages over competitive specialty compounds in dozens of automotive applications which require superior ozone and weathering resistance.

Progressive manufacturers of automotive rubber products prefer SYNPOL 8201 because it permits them to meet SAE-ASTM specification R-515 at savings of *10 to 15% over specialty compounds which merely meet R-508!*

8201's superior tensile strength, great dimensional stability, excellent filler tolerance, efficient utilization of protective chemicals, superior coefficient of friction, and low modulus characteristics combine with its precise extrusion and molding characteristics to make such performance possible.

Ozone- and weather-resistant SYNPOL 8201 compounds are non-staining and non-discoloring; have excellent glass and metal gripping qualities, all of which are extremely important for automotive window molding. Compare its superior physicals *and* its lower ultimate cost and it's easy to see why it has become the standard of the industry.

For full technical information, write TEXUS, 9 Rockefeller Plaza, New York 20, N. Y. Or call JUdson 6-5220.

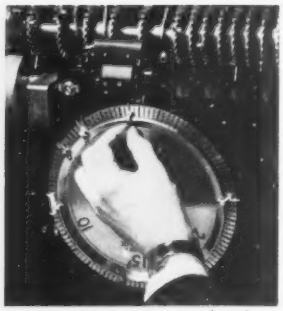
COMPARE THESE SAE-ASTM TEST RESULTS		
	Competitive Specialty Compound (R-508 spec.)	SYNPOL 8201 Compound (R-515 spec.)
Tensile, psi (min.)	650	1515
Elongation, % (min.)	430	525
Shore A Hardness	65	52
Weather Resistance, 90 days outdoors	Cracks	No Cracks
Torsional Modulus, psi	11,100	50,000
Dimensional Stability	Poor	Excellent
Cost/100 pieces (min. finishing operations)	$79.81	$70.52 (11.5% savings)
Cost/100 pieces (max. finishing operations)	$228.95	$197.39 (13.5% savings)

TEXUS *Pace Setter in Synthetic Rubber Technology*

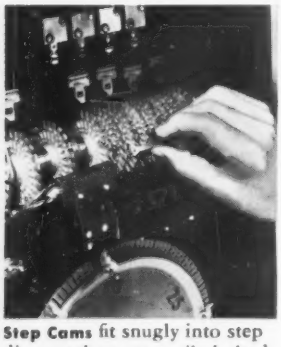
TEXAS-U. S. CHEMICAL COMPANY, 9 Rockefeller Plaza, New York 20, N. Y. JUdson 6-5220

New Taylor **FLEX-O-TIMER®** *Timed-Program Controller...*

gives you—



Program Trip Pins are simply placed at selected intervals, set screws tightened with an Allen wrench.



Step Cams fit snugly into step disc notches, are easily bolted into place, never have to be adjusted.

- Up to 12 pneumatic and or electric functions
- Faster, easier setting of Program Trip Pins
- Positive acting air valves with more than 3 times previous output capacity

Recognized for many years as a highly versatile "robot brain" for the precise timing and coordination of batch processes, this new FLEX-O-TIMER Controller has been made even more simple to operate, more precise in its control. It is ideal for providing completely automatic time control for tire presses, particularly for nylon cord tires requiring additional functions; platen presses; or any process requiring precise timing of process sequence and duration involving temperature, pressure, mechanical motion, electrical energy, or any combination thereof.

As well as the three major improvements listed above, the new FLEX-O-TIMER Controller incorporates these plus features:

- Extremely short time intervals between steps (with high accuracy) can be accommodated . . . 7½ seconds on 30 minute cycle dial; minimums on other dials in same ratio.
- Cycle range is quickly adjustable for 15 to 60 minutes for high-speed range. 1 to 16 hours for low-speed range.
- Time dial automatically resets to zero in maximum of 13 seconds at completion of cycle.

Ask your Taylor Field Engineer for full details, or write for **Bulletin 98373.** Taylor Instrument Companies, Rochester, New York, and Toronto, Ontario

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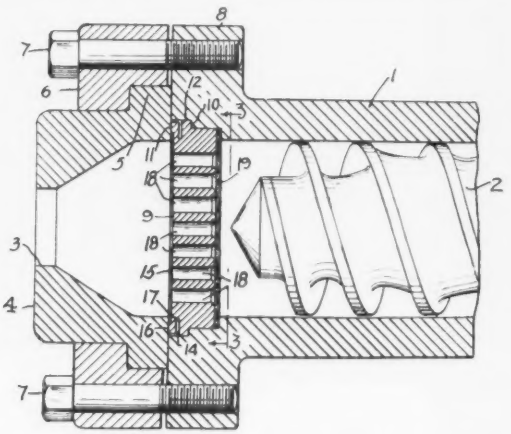
PATENT REVIEW

by Melvin Nord

Extruder and Strainer Plate

U. S. Patent 2,923,972, issued Feb. 9, 1960 to Anselm DeGhetto and assigned to National Rubber Machinery Co., provides an extruder that consists of a cylinder or barrel having a feed opening at one end for the introduction of plastic material to be plasticized and worked in it. It also has a die or discharge opening at the other end from which the plasticized material is extruded, and a feed screw rotating in the barrel.



In the present invention, as shown in the illustration, a resilient strainer plate (9) is provided across the end of the barrel (1), to hold back unmelted particles of the material and to build up a back pressure. A resilient seating rib (16) keeps the strainer tight, preventing leakage around it.

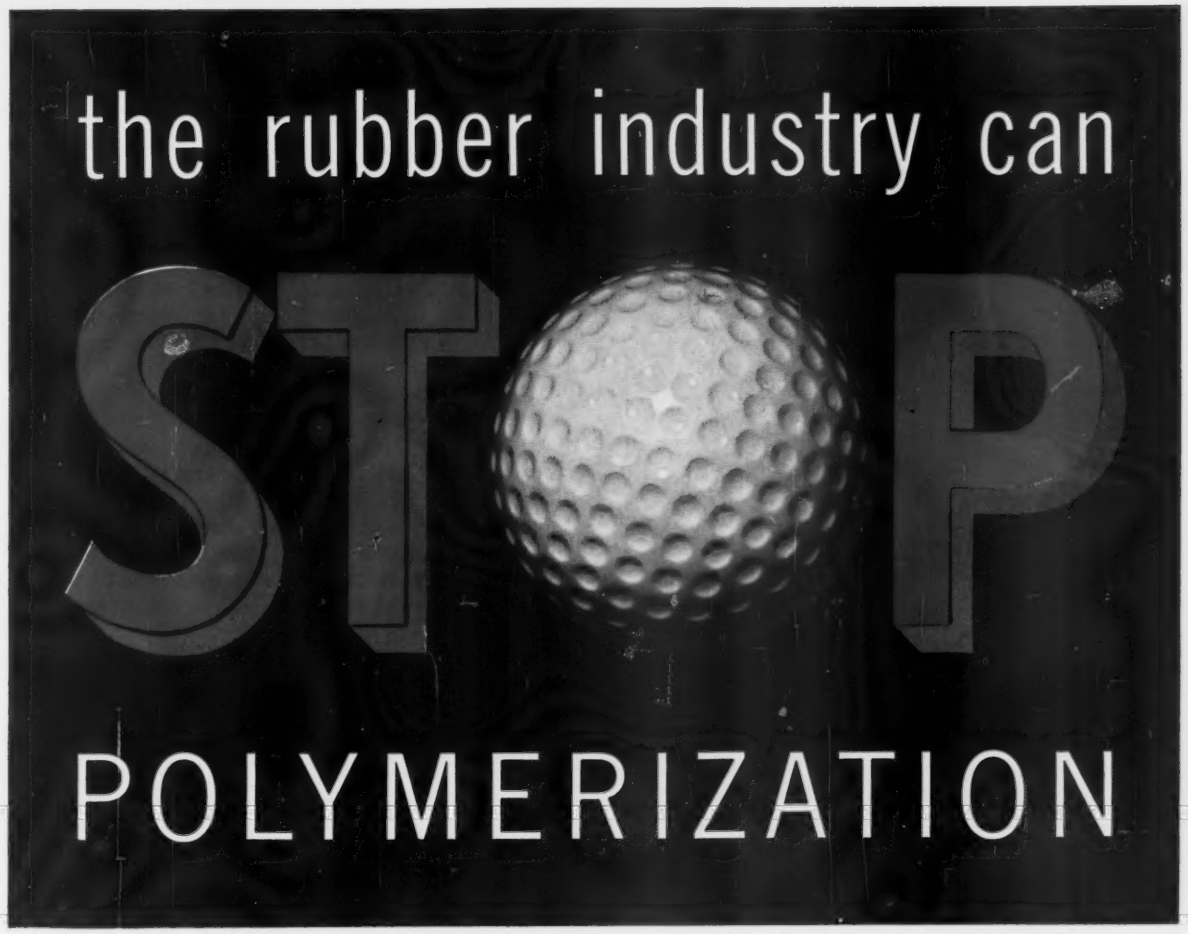
Preventing Exposure Cracking of Rubber

U. S. Patent 2,926,155, issued Feb. 23, 1960 to Albert J. Greene and assigned to Monsanto Chemical Co., is concerned with the inhibition of the deleterious effects of ozone by incorporating into the sulfur-vulcanizable compositions an anti-exposure cracking agent. These agents are anilines such as 3,5-dimethoxy-p-toluidine.

Processing Synthetic Rubber Latex

U. S. Patent 2,927,065, issued March 1, 1960 to Robert A. Gerlicher and William P. Denson, Jr., assigned to Copolymer Rubber and Chemical Corp., describes a method of separating distillable material from synthetic rubber latex to reduce pre-floc formation.

the rubber industry can



POLYMERIZATION

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HYDROXYLAMMONIUM SULFATE

Hydroxylammonium Sulfate—$(NH_2OH)_2 \cdot H_2SO_4$—is an excellent non-discoloring short stopper for use with peroxide-catalyzed polymerizations. It is used in the production of butadiene-acrylonitrile rubber and other polymers.

Physical Properties	HYDROXYLAMMONIUM SULFATE
Formula	$(NH_2OH)_2 \cdot H_2SO_4$
Molecular Weight	164.14
Melting Point, °C	177*
pH of 0.1 M Aqueous Solution at 25°C	3.7
Solubility in 25°C, g/100 g solvent	
In Water	63.9
In 95% Ethanol	0.2
In Methanol	0.1

*Melts with decomposition.

"HS" destroys the peroxide polymerization catalyst as soon as polymerization has progressed to the desired stage. Products of decomposition are oxides of nitrogen which do not remain in the final product. "HS" is adaptable to both hot and cold polymerizations.

Some reports indicate improvement of rubber quality when "HS" is used. It has been found, too, that on a cost-efficiency basis, Hydroxylammonium Sulfate actually is more economical than some commonly used short stoppers.

Write for sample and technical data.

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...stays *young*, too!

You can safely "scoot" on tires made with RECLAIMATOR rubber.

In a recent series of tests three leading tire manufacturers proved that RECLAIMATOR rubber adds WEATHER RESISTANCE to their tires. The tire sidewall compound contained 19% of reclaimed rubber, and RECLAIMATOR rubber was compared pound for pound with the best matching conventional reclaims. In a static test, tires were mounted on wheels, inflated to 30 lbs. pressure, and were exposed horizontally to sunlight, ozone and weather on a Los Angeles roof for 90 days. In a dynamic test, similar tires were driven in the area for 90 days. Results of tests show that tires made with conventional reclaim had many weather cracks on the sidewall, but sidewalls containing RECLAIMATOR rubber had practically none.

U.S. **RUBBER RECLAIMING CO., INC.**
P. O. BOX 365 BUFFALO 5, N. Y.

PATENT REVIEW

Blending of Rubber with Styrene

U. S. Patent 2,895,939, issued July 21, 1959 to Kenneth E. Stober et al, and assigned to The Dow Chemical Co., provides a method for preparing rubber in a granulated form for blending with vinyl aromatic compounds such as styrene by direct dissolution, for the manufacture of graft copolymerized products.

Bales of rubber are sliced in a guillotine slicer to pieces weighing about ten pounds each. These pieces are dropped into a conventional rotary-knife type cutter, with about 10 per cent polystyrene dust (molecular weight about 20,000). The dusted, small rubber pieces are ground to about ⅜ inch size, and are then conveyed by a current of air to an agitated dissolver containing monomeric styrene.

Anti-Skid Coatings for Tires

U. S. Patent 2,921,918, issued Jan. 19, 1960 to Melvin Mooney and Theodore L. Ether, assigned to United States Rubber Co., describes a method of providing tires with an anti-skid coating.

A solution containing, by weight: 100 parts of wood resin, 10 parts of maleic anhydride-modified Paracril, 7.5 parts of dibutyl phthalate and 250 parts of acetone—making a volume of 100 units—is blended with 3.64 volume units of methanol. The solution is cleaned by passing it through a tightly woven cloth-filter. It is then sprayed on a wet tire-tread surface. The water on the tire enters the solution, reduces the solubility of the rosin and rubber, thereby causing coagulation on the tire surface.

Vulcanization of Natural Rubber

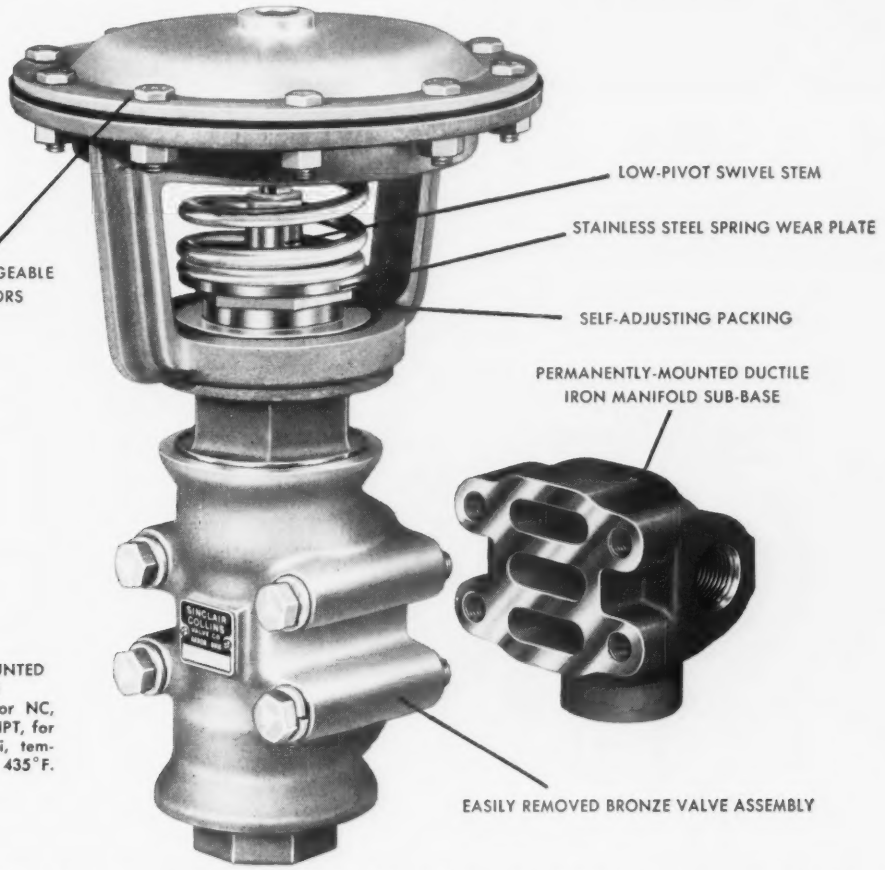
U. S. Patent 2,909,584, issued Oct. 20, 1959, to Carl R. Parks and assigned to Goodyear Tire & Rubber Co., describes an improved method for vulcanizing natural rubber by use of a ditertiary peroxide, in addition to a sulfur-bearing curing agent and an accelerator. This composition gives a high, flat modulus curve, even over extended curing times.

Production of Chloroprene

U. S. Patent 2,926,205, issued Feb. 23, 1960 to Frederick J. Bellringer, describes a process for the production of chloroprene by the dehydrochlorination of 3:4-dichlorobutene-1 with an aqueous solution of an alkali, in the presence of a picrate. The presence of the picrate inhibits polymerization of the chloroprene and permits the obtaining of greatly improved yields.

NEW - SINCLAIR-COLLINS

1/2" manifold-mounted steam valve



S-C MANIFOLD-MOUNTED STEAM VALVE
2- and 3-way NO or NC, tapped ½- or ¾-in. NPT, for pressures to 350 psi, temperatures from 0 to 435°F.

Want excellent flow characteristics and bubble-tight sealing? Want maximum service life and minimum downtime for maintenance? Want compact, versatile design and ease of installation? Then you'll specify Sinclair-Collins' new manifold-mounted steam valve.

S-C's low-pivot hollow swivel stem places the pivot point *within* the extra-long bearing area to minimize side thrust and wear . . . provides maximum packer life. Self-adjusting spring-loaded Teflon chevron packing requires no attention. Piloting of all assembled components eliminates misalignment of stem. These features, plus Sinclair-Collins' precision manufacturing techniques are your assurance of long trouble-free valve life.

What's more, S-C's new valve can be converted from NO to NC, or vice versa, by rotating it 180° on the manifold sub-base.

Some day, maintenance will be necessary . . . it's simple . . . just loosen four mounting bolts, remove the valve for later bench servicing and install a replacement . . . downtime can be measured in minutes!

Find out how this advanced design valve can improve the performance of machines you have in service or on the drawing board. Your Sinclair-Collins field engineer has all the details.

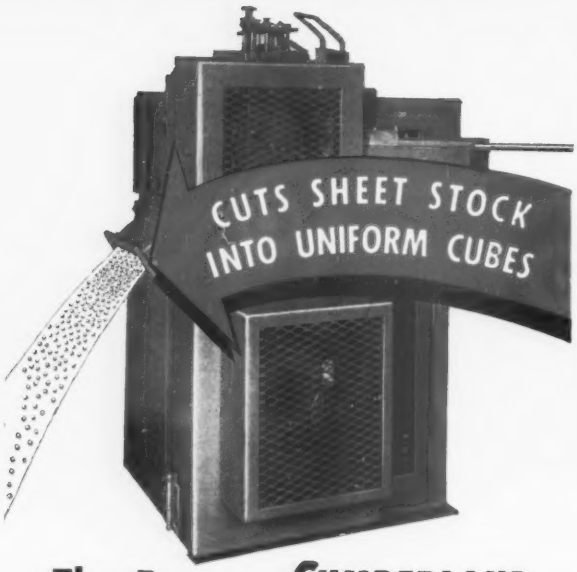
For more information, write for free Bulletin MV-60. Address The Sinclair-Collins Valve Company, 454 Morgan Avenue, Akron 11, Ohio, Dept. RA 1060.

The SINCLAIR-COLLINS VALVE Co.
DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

8128

The Best Method Yet Devised . . .

FOR DICING SHEET STOCK



The Famous CUMBERLAND "Stair-Step" Dicer

Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.

Write for Complete Information

For Granulating Plastic . . .
Investigate Cumberland's complete line of granulating machines. Request Bulletin 590.

CUMBERLAND Engineering Co. Inc.
DEPT. S · BOX 216 · PROVIDENCE · RHODE ISLAND
Builders of Better Machines for the Rubber and Plastics Industry

PATENT REVIEW

Tire-Thread Cutting Apparatus

U. S. Patent 2,921,627, issued Jan. 19, 1960 to George V. Constantakis and assigned to United States Rubber Co., describes an apparatus for forming slits or slots in tire treads to increase their traction without removing the tires or jacking up the wheels on which the tires are mounted to slit or slot their treads.

The apparatus includes a track or frame, formed of spaced tire supporting elements on which a vehicle may roll. Mounted in the spaces between the tire-supporting elements are cutting tools for forming slots or slits in the treads of the tires as they roll along the track.

Impregnation of Vulcanized Foam Rubber

U. S. Patent 2,926,390, issued March 1, 1960 to Anselm Talalay, William D. Coffey, and Joseph Talalay, assigned to the B. F. Goodrich Co. and the Dayton Rubber Co., describes a process for making latex foam rubber. The vulcanized foam rubber is treated with an aqueous dispersion of colloidal silica to increase the compression resistance or load-bearing capacity of the foam rubber. The other physical properties of the foam rubber remain relatively unaffected.

Oil Extended Rubber Compositions

U. S. Patent 2,935,485, issued May 3, 1960, to Richard J. Reynolds and assigned to Shell Oil Co., discloses an oil extended rubber composition which is contaminated with an iron salt, but is effectively stabilized against oxidative degradation by means of a magnesium salt of any organic acid containing at least six carbon atoms (*e.g.* magnesium stearate).

Preferably two or three moles of magnesium are provided per mole of contaminating iron.

Enhanced Antiozonant Protection for Rubber

U. S. Patent 2,921,922 issued Jan. 19, 1960 to James O. Harris and assigned to Monsanto Chemical Co., provides a method of improving the resistance of rubber to degradation due to ozone. Exposure cracking was inhibited by incorporating a substance of the class of 3-aminocarbazoles in the rubber.

Copies of any patents, including those described here, are available from the Commissioner of Patents, Washington 25, D. C., for 25 cents each. Do not send stamps.

Rationalisation in Carbon Black transport

KETJEN CARBON

invented the

TILT-O-CON

a new type of container, which is tilted for complete filling and emptying. Besides easy handling and unloading, the Tilt-O-Con offers these big advantages to consumers of Ketjenblacks:

ECONOMICAL PACKING This sturdy light-weight aluminium container holds one ton of carbon black and can be used over and over again. Just ship it back for filling with any of the seven types of Ketjenblack you require. Its design is such that during transport the Tilt-O-Con takes up a minimum amount of space.

NO WAREHOUSE SPACE The Tilt-O-Con may be stored in the open air indefinitely. So valuable warehouse space may be used for less durable materials. The corrosionproof material and the air-tight closures protect the contents against contamination. The container can be stacked three high, thus taking up a minimum of floor space, whether indoors or outdoors.

NO DUST, NO SPILLING The special design of the openings and closures of the Tilt-O-Con and of the fool-proof unloading system prevent carbon black from being spilt and avoid dust formation.

SAVING LABOUR COST With the Tilt-O-Con one man can unload one ton of carbon black in less time than traditionally.

Blacks from the country where the black tulip grows

Available on request: *A brochure describing in detail the Tilt-O-Con as well as various suggested unloading systems for large and small consumers of*

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KETJENBLACK LHI
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KETJENBLACK CR
KETJENBLACK FEF
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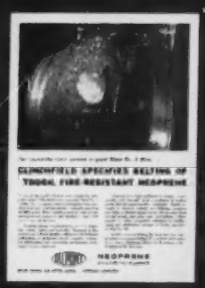
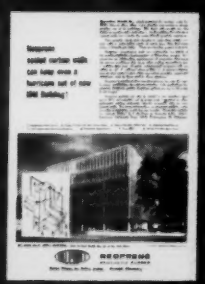
Sales Office: **NEDERLANDSCH VERKOOPKANTOOR VOOR CHEMISCHE PRODUCTEN N.V.**

63, Mauritskade – Amsterdam – Holland – P.O.B. 4038 – Telephone 54322 – Telex 12270 – Telegr. Chemicals

For technical sales service directly apply to: Ketjen Carbon N.V. – P.O.B. 15 C – Amsterdam – Holland – Telephone: 60821

HOW DU PONT NEOPRENE, PLUS CONSISTENT PROMOTIONAL SUPPORT, HELPS CREATE ADDED SALES APPEAL FOR YOUR PRODUCTS





HERE ARE KEY MARKETS REACHED IN INDUSTRIAL AND CONSUMER PUBLICATIONS LIKE THESE:

CHEMICAL
Chemical Engineering
Chemical Engineering Progress

OIL
National Petroleum News
Oil & Gas Journal

MINING
Coal Age
Engineering & Mining Journal

WIRE & CABLE
Electrical Construction and Maintenance
Electrical West
Electric Light & Power
Electrical World
Electrified Industry

MAINTENANCE
Corrosion
Industrial Distribution
Mill & Factory
Plant Engineering
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SHOE
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Mechanix Illustrated
National Safety News
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Machine Design
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AUTOMOTIVE
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SAE Journal

BUILDING
Architectural Record
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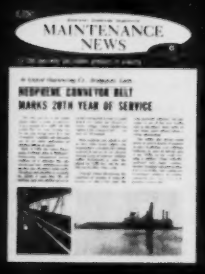
RUBBER
Rubber Age
Rubber Red Book
Rubber World

ADHESIVES
Adhesives Age

BUSINESS AND TECHNICAL MANAGEMENT
Fortune
Scientific American



DU PONT
REG. U. S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

When a single synthetic rubber demonstrates, for more than 25 years, its ability to improve product performance and give long, dependable service life under the most rigorous conditions, that's *one* kind of sales power — and reason enough for using Du Pont *neoprene* in the products you process or manufacture.

ALL-OUT SALES SUPPORT

Couple this with a quarter century of advertising and promotional support geared expressly to help *you* make this sales power pay off, and you've got a combination that's difficult to match. This year, for instance, extensive advertising — examples of which you see here — continues to reach your customers . . . informing them of new applications for neoprene . . . reminding them of its consistent performance record . . . *selling* them on the properties of this versatile elastomer.

Many of your customers learn the facts about neoprene through subscriptions to such Du Pont publications as ELASTOMERS NOTEBOOK, ELASTOMER NEWS FOR AUTOMOTIVE ENGINEERS, MAINTENANCE NEWS, WIRE AND CABLE CASEBOOK and assorted booklets, brochures and mailing pieces plus motion pictures and publicity . . . that spell out, clearly and convincingly, neoprene's ability to do a job. Still others have seen neoprene on the job at trade shows, such as the Society of Automotive Engineers, American Institute of Architects and Design Engineering Show.

AN IMPORTANT SALES ASSET

To men in the rubber industry, neoprene offers an important added advantage: the extra selling power of its name. It's an advantage you can capitalize on easily. How? By putting the neoprene name to work, wherever possible, right on the rubber products you make . . . by merchandising it to your customers . . . by including it in your own advertising and promotional efforts. You'll find neoprene's reputation a vital selling tool.

For more information, plus a subscription to any of the Du Pont periodicals mentioned above, write: E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department RA-10, Wilmington 98, Delaware.

PROVED IN SERVICE

More than a quarter century of industrial service stands back of neoprene's reputation for quality and long-term economy. Because of its unique balanced combination of properties, neoprene affords excellent resistance to a wide variety of deteriorating elements, including heat and cold, ozone and weather, oil and grease, acids and chemicals, aging and abrasion. It's also flame resistant. That's why, in applications ranging from shoe soles and space suits to structural sealing gaskets, neoprene has earned the kind of widespread customer acceptance that stimulates sales.

NEOPRENE
SYNTHETIC RUBBER

ENJAY BUTYL

wraps-up new safety for chemical workers!

Chemical workers' rubbers made of Enjay Butyl protect feet from acids and other chemicals, from moisture, and from slipping, too.

A new Butyl compound with special advantages is made into work rubbers by Tingley Rubber Company, Rahway, N. J. In this and other applications where resistance to acids and chemicals is required – the inherent inertness of the molecular structure makes Enjay Butyl first choice for the job!

Because Enjay Butyl does jobs no other rubber can do, it helps upgrade the performance of many products. You can have more information about this versatile rubber by contacting: *Home Office:* 15 West 51st Street, New York 19, N. Y. *Other Offices:* Akron • Boston • Charlotte • Chicago • Houston • Los Angeles • New Orleans • Plainfield, N. J. • Southfield, Mich. • Tulsa

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ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY® BUTYL

• **Improved Public Relations Needed by Rubber Footwear Industry.** Complaining about mounting foreign competition supplying rubber footwear at very cheap prices is not enough. If the industry wants to fight, it has to devise a plan. Unfortunately that has not been done and it is for this reason that the October, 1960 issue of *Fortune* ridicules our industry in the following way:

It appears that the American rubber-footwear industry has been hampered in its efforts to make a case before the Tariff Commission because there are no accurate data on imports of rubber footwear. "The lack of such statistics," said Representative Brademas of Indiana, "has caused the domestic industry great difficulty in ascertaining the extent to which imports of rubber footwear have caused serious injury within the meaning of the escape clause." In other words, the industry doesn't have the figures, but it still knows that cheap foreign imports are the problem. Getting the figures will obviously be hard, because footwear comes in such a bewildering variety these days. Representative Brademas complained that nobody knows how many pairs of "zories"—these are Japanese rubber thong sandals—are imported annually; nobody knows how many of the sneakers imported are for basketball and how many for tennis; and so on. To get things straightened out, the industry is demanding a much more precise and detailed recording of footwear imports. The proposal envisages, of course, that the "recording and compilation of rubber footwear import statistics . . . shall be made at the expense of the United States . . ." and finally, when the government has collected such figures for a year or two, the industry promises to take them before the Tariff Commission and get the tariff on foreign imports raised. Assuming, of course, that the figures bear out the rubber-footwear industry. If they don't, some Indiana protectionists may need a few pair of sneakers themselves.

It will require the services of a very skillful public relations organization to repair the damage done by the behavior of the industry and by the more or less justified comments of that leading industrial magazine.

• **Indian Industry Benefits from New Agreements.** The Phillips Petroleum Co., manufacturing carbon black, is helping India's industrial situation. An English company, Antony Gibbs and Sons, cooperates in the manufacture of insulated cable.

The U.S. Development Loan Fund approved eight loans to India totaling $99.2 million, repayable in rupees, largely for expansion of its power supply.

The U.S. Technical Cooperation Mission agreed to provide $713,000 and the equivalent of $525,000 in rupees for the establishment and initial operation of the Indian Investment Center, which is designed to facilitate and encourage a larger flow of private foreign investment into Indian industry.

• **Snob Appeal in Products.** American products of all kinds are at present very attractive to Western Europe. Due to the fact that the standard of living is rising rapidly, quite a number of people are not satisfied with the domestic merchandise anymore. They are intrigued by the glittering packages of well designed American goods and it is for this reason that in all parts of Europe there is great interest in American merchandise.

It is for this reason that Kaufring, a leading purchaser for chain stores in the Federal Republic of Germany, is interested in obtaining U.S. consumer products of all varieties for sale on the German market by its 431 member firms. These member firms are principally retailers in small and medium-sized towns.

The traditional and standard buying practice of the central organization is to bulk buy a wide range of consumer goods both on the domestic and foreign market. Samples of these products and pertinent sales data are examined by its members at exhibitions which Kaufring organizes four times a year in Duesseldorf. The member firms then select and purchase the items in demand. The organization's total sales for the fiscal year 1958 to 1959 reportedly amounted to about $200 million, indicating the foreign market potential of this chain.

Kaufring is particularly interested in obtaining U.S. textiles, clothing, cosmetics, hardware goods for kitchen and household, and many articles made of rubber for use in the modern kitchen or apartment.

Companies interested in doing business with this organization may send samples, catalogs, price lists and other sales literature to Kaufring, G.m.b.H., Heinrich Ehrhardt Str. 61, Duesseldorf, attention Dr. Rudolf Cropp, Export/Import Director.

• **Chemical Apparatus Exhibit.** Achema, the 13th Exhibition-Convention of Chemical Apparatus, is scheduled for June 9-17, 1961, at the Frankfurt fairgrounds in conjunction with the European Congress of Chemical Engineering. Held every 3 years,

in 1958 Achema drew some 95,000 visitors, engineers, scientists, and businessmen. Exhibiting firms totaled 1,030, of which 158 were from 16 foreign countries.

The European Congress of Chemical Engineering, held concurrently, will incorporate meetings of the Society of German Chemists, the German Society of Chemical Apparatus, and the German Isotope Society. The European Federation on Corrosion plans a symposium on the Physical and Chemical Durability of Structural Materials in Chemical Industry.

About 1,100 firms, including 236 from abroad, plan to participate. The United States is expected to be represented by 22 companies.

A list of U.S. exhibitors and an illustrated brochure, "Invitation to Achema," are available from the Trade Development Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C.

• **$7,250 a Year and Red Tape Make Us the Villain in the World of Patents.** In October 1958 the Convention of Paris for the Protection of Industrial Property, adopted on March 20, 1883, was revised for the fourth time. The United States was a party to the original convention and to the four later revisions. The President transmitted the revised convention to the Senate on February 17, 1960. The Industrial Property Convention, with the revisions presently in force, is the major intergovernmental instrument assuring protection of industrial property rights of United States nationals abroad; namely, patents, trademarks, designs, commercial names and related rights. It is based on two important underlying principles—that of national treatment, and that of the extension of special rights or advantages. Under the national treatment principle each member government is required to extend to nationals of other member countries the same protection and rights which it grants to its own nationals in this field. Under the second principle, each country is required to provide certain rights or special advantages for other members' nationals, one of the most important of which is the right of priority for foreign patent applicants. Such applicants have a one-year period, from the date of filing of the first application in their own country, in which to file corresponding applications—which are given the benefit of the date of the first filing and receive protection in other countries.

In the latest revision, the basic provisions concerning protection of trademarks have been rewritten so as to increase substantially the protection accorded the trademark rights of nationals of member countries. An American national now clearly may register a trademark in any member country by complying with the formalities of such country without having to prove the existence of a registration in the United States.

Further, the conference agreed on the inclusion of a requirement that all countries grant protection to industrial designs. It also included in the Convention for the first time specific reference to the protection of trademarks associated with services, as distinct from those used to identify goods.

The Department of State submitted to the Senate Foreign Relations Committee a seven page statement on June 21, urging the committee to adopt the Lisbon revision of the Convention and to accept the Senate Joint Resolution No. 149 and House Joint Resolution 627, authorizing contributions to the administration bureau in Switzerland.

The State Department pointed out that no professional group, industry, or other organization in the United States has come out against the proposals; on the contrary all professional groups, the American Patent Law Association, the American Bar Association, the International Patent and Trademark Association and many others have been in favor of adopting the resolutions.

Forty-nine countries have already accepted the new revisions, a fact which will of course insure and improve our relations with these countries, if we adopt the revisions also.

At the 1958 Conference of Revisions at Lisbon, the United States supported a resolution to raise the budget ceiling to 588,000 Swiss francs and, also to amend the provisions of the Convention to permit periodic revisions of the budget ceiling without necessitating a diplomatic conference of revision. However, the Soviet Bloc countries that were present opposed these proposals on the grounds that since East Germany had not been invited as a member country, nothing could be approved in its absence.

Soviet Bloc compromise solutions were worded so that approval could have been construed as an acceptance of the argument that East Germany should have been present. This was entirely unacceptable to the West German and United States delegations and agreement was not possible.

As a compromise, the conference finally adopted a resolution inviting ". . . the countries of the Union to raise their contributions retroactive to the first of January 1959 in order to bring the funds of the International Bureau to the amount of 600,000 Swiss francs annually." The United States annual share, calculated on the basis of this new amount, would be approximately $7,250. We have informed the Bureau, according to the State Department, that it would be advised in due course whether or not this Government would be able to accept the invitation to increase its contribution. The most recent information available to us shows that 34 countries have already responded affirmatively to this Resolution. The U.S. has not yet complied.

how to vastly increase the useful life of rubber...

Consider the effect of your curing system on the effectiveness of a chemical antiozonant

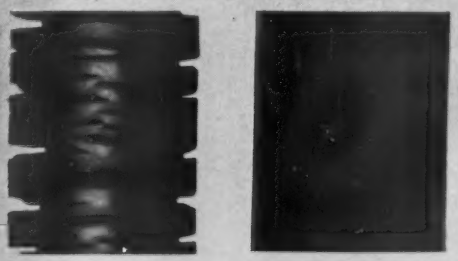
In compounding rubber, use of a potent antiozonant like UOP 88 or 288 is essential in assuring maximum crack-free life. But do you realize what a vast difference may be made by your *curing system?*

Look at the two rubber test strips illustrated. Both were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems —a vast increase in resistance to cracking!

Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

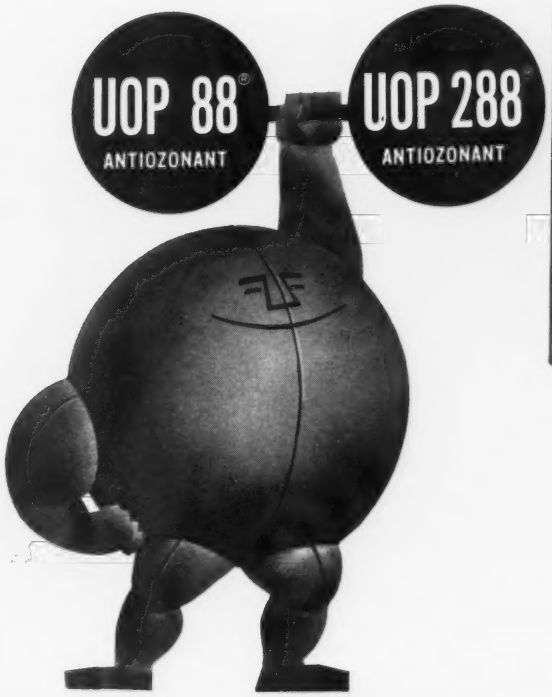
UOP ozone cabinets provide test conditions at a wide range of ozone concentrations.

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.



Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.



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UNIVERSAL OIL PRODUCTS COMPANY
30 Algonquin Road, Des Plaines, Illinois, U. S. A.
WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

3M COMPANY CHEMICALS THE RAW MATERIALS OF PROGRESS

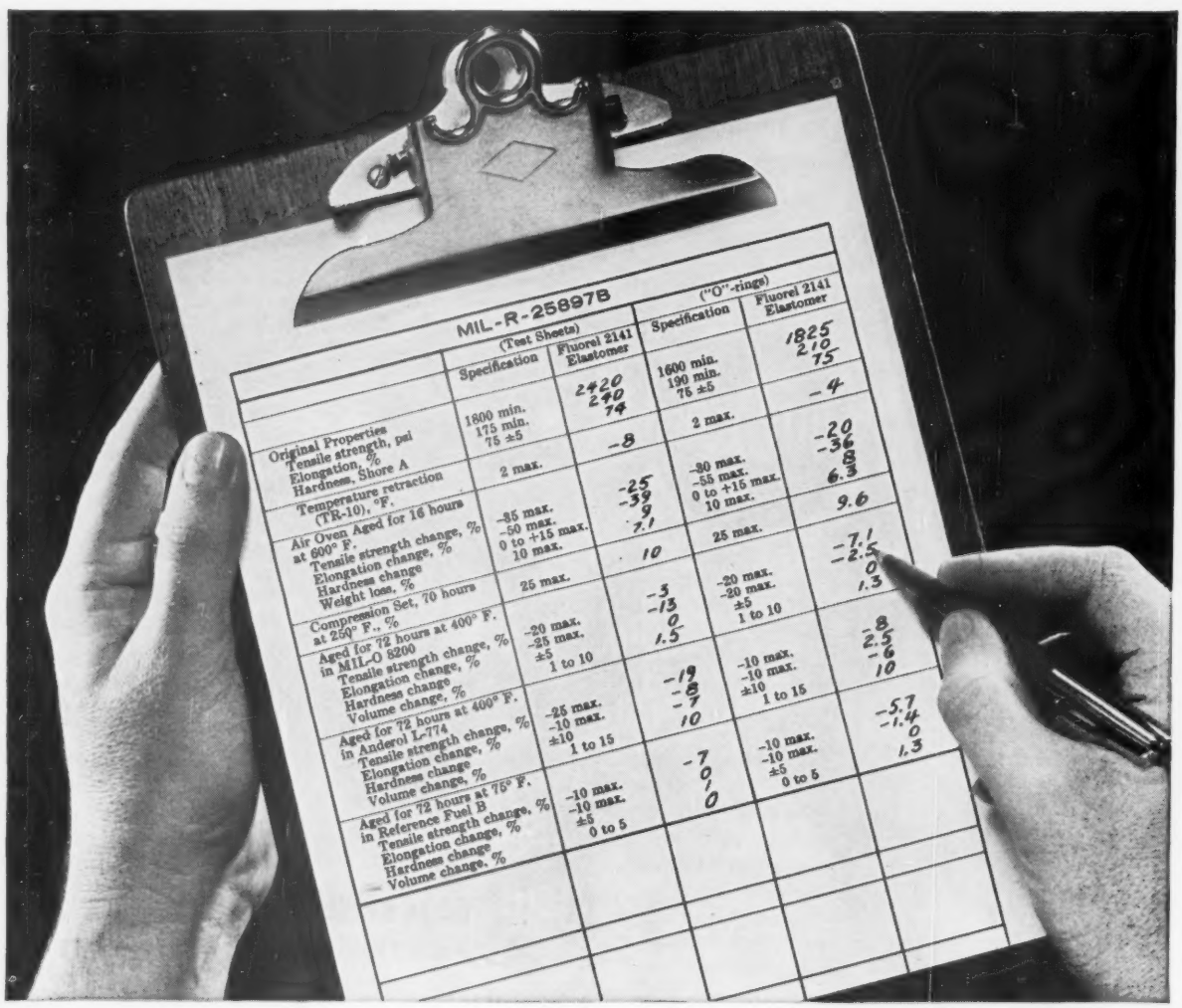
NEW FLUOREL® 2141

BRAND ELASTOMER

Superior rubber products reaching "MIL-specs" result when you compound with new FLUOREL 2141 Brand Elastomer. Its outstanding workability and excellent Mooney Scorch Rating permit faster, safer cures with fewer defects, rejects or scrap.

And there is the matter of its inherent safety. FLUOREL 2141 Elastomer allows repeated reprocessing to produce high quality parts. You can readily attain parts with superior physical, thermal and electrical properties, having good heat aging and minimum compression set.

FLUOREL 2141 Elastomer also provides excellent



MIL-R-25897B quality assures better rubber products

resistance to corrosive chemicals, fuels, solvents and ozone. Non-flammable, it resists combustion even when applied to flammable products. It is readily processed on standard rubber compounding and fabricating equipment . . . may be molded, extruded and bonded to most metals. A wide variety of fillers and extenders may be used with it.

FLUOREL 2141 Elastomer also provides: Easier extruding. As many as four re-extrusions possible without evidence of scorching. Elimination of "backrinding" when removed from mold (see "O" rings). Better tensile strength.

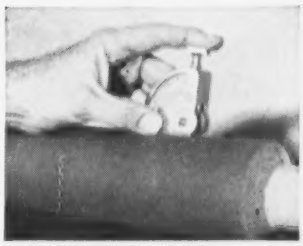
For oil seals, "O" rings and gaskets, fire walls, air ducts, fuel cells, fuel and hydraulic hose, diaphragms and tank linings, FLUOREL 2141 Elastomer delivers superior performance where high temperatures and corrosive media are involved. For complete performance data, write today to: 3M Chemical Division, Dept. KCC-100, St. Paul 6. Minn.

Corona cracking, dimensional stability problems solved with 3M Company Chemicals

CUTS CORONA CRACKING

FURA-TONE® Brand Resin NC-1008 added to neoprene compound ignition cable jackets made by Belden Manufacturing Company, almost eliminates corona cracking, as seen in this comparison of two types of jackets. The FURA-TONE NC-1008 compound cut raw materials cost by as much as 8%, reduced scrap waste by 50%, improved processing.

PLASTICIZES PRINTING ROLLERS



TURPOL® Brand Plasticizer NC-1200 was the only one of 112 plasticizers that properly retained the dimensional stability of Ideal Roller & Manufacturing Company's synthetic rubber rollers for close tolerance work. This chemical softens the rollers, but it does not leach out in oils or solvents.

"FLUOREL", "FURA-TONE" and "TURPOL" are Reg. T.M.'s of 3M Co.

CHEMICAL DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

NEW!

THE RUBBER FORMULARY

STARTER SET $250

There is no single service that offers greater value to the manufacturer of rubber goods, or to any laboratory or organization concerned with rubber compounds, than THE RUBBER FORMULARY. This monthly service has been supplying compounders with detailed, practical information on almost every type of rubber compound for the past twelve years, serving the rubber industry in very much the same manner the pharmacopoeia serves the pharmaceutical industry.

THE RUBBER FORMULARY is sold on an annual subscription basis (by calendar year) and is issued in monthly shipments of cards, so designed as to make it possible for the user to locate and select formulas meeting specifications for hardness, elongation, tensile range etc., in a matter of minutes. Annual subscriptions are available at $95 a year.

FOR THE BENEFIT AND CONVENIENCE OF THE ENTIRE RUBBER INDUSTRY . . .

THE RUBBER FORMULARY is making available for the first time a STARTER SET. This contains 2365 rubber compounds selected from the more than 9100 published in the FORMULARY in the years 1948 through 1957 inclusive. Selections have been made to give the best condensation for practical purposes . . . eliminating obsolete compounding materials and closely similar compounds, keeping those on which the most properties are reported.

Like the RUBBER FORMULARY, the STARTER SET utilizes a punched card system of recording and classifying compounds. Individual filing cards are provided for the compound. Notches and imprints on the edge of the card serve for the classification and indexing of each compound. They are so designed that every compound is classified according to the principal physical properties, according to the type of rubber hydrocarbon, and as to whether or not the compound contains carbon black. Additional space is provided so that the user can add his own classifications.

CONTAINS:

2365 rubber compounds on individual punched cards presorted first by polymer, then each polymer grouped into black and nonblack subgroups, further subdivided by hardness and then by tensile.

115	compounds	for natural rubber, black
154	"	for natural rubber, nonblack
276	"	for styrene rubber, black
150	"	for styrene rubber, nonblack
259	"	for nitrile rubber, black
97	"	for nitrile rubber, nonblack
254	"	for neoprene, black
116	"	for neoprene, nonblack
101	"	for butyl, black
57	"	for butyl, nonblack
50	"	for polysulfide, black and nonblack
36	"	for reclaim (all black compounds)
45	"	for Hypalon, black and nonblack
86	"	for silicone rubber, black and nonblack
92	"	for vinyls (all nonblack compounds)
100	"	for miscellaneous other rubbers, black and nonblack
156	"	for blends of general purpose rubbers (natural, styrene, butyl, reclaim), black
71	"	for blends of general purpose rubbers, nonblack
77	"	for blends containing oil-resistant rubbers, black
73	"	for blends containing oil-resistant rubbers, nonblack
2365	compounds	Total

PRICE $250 for the set.

USE THIS CONVENIENT ORDER COUPON

DATE .....

RUBBER AGE
101 West 31st Street
New York 1, N. Y.

Gentlemen:

☐ Please send me ( ) of the new RUBBER FORMULARY STARTER SET @ $250 for each set.

☐ Please enter my subscription to THE RUBBER FORMULARY, effective with the January 1960 issue, at $95.00 per year.

NAME _____

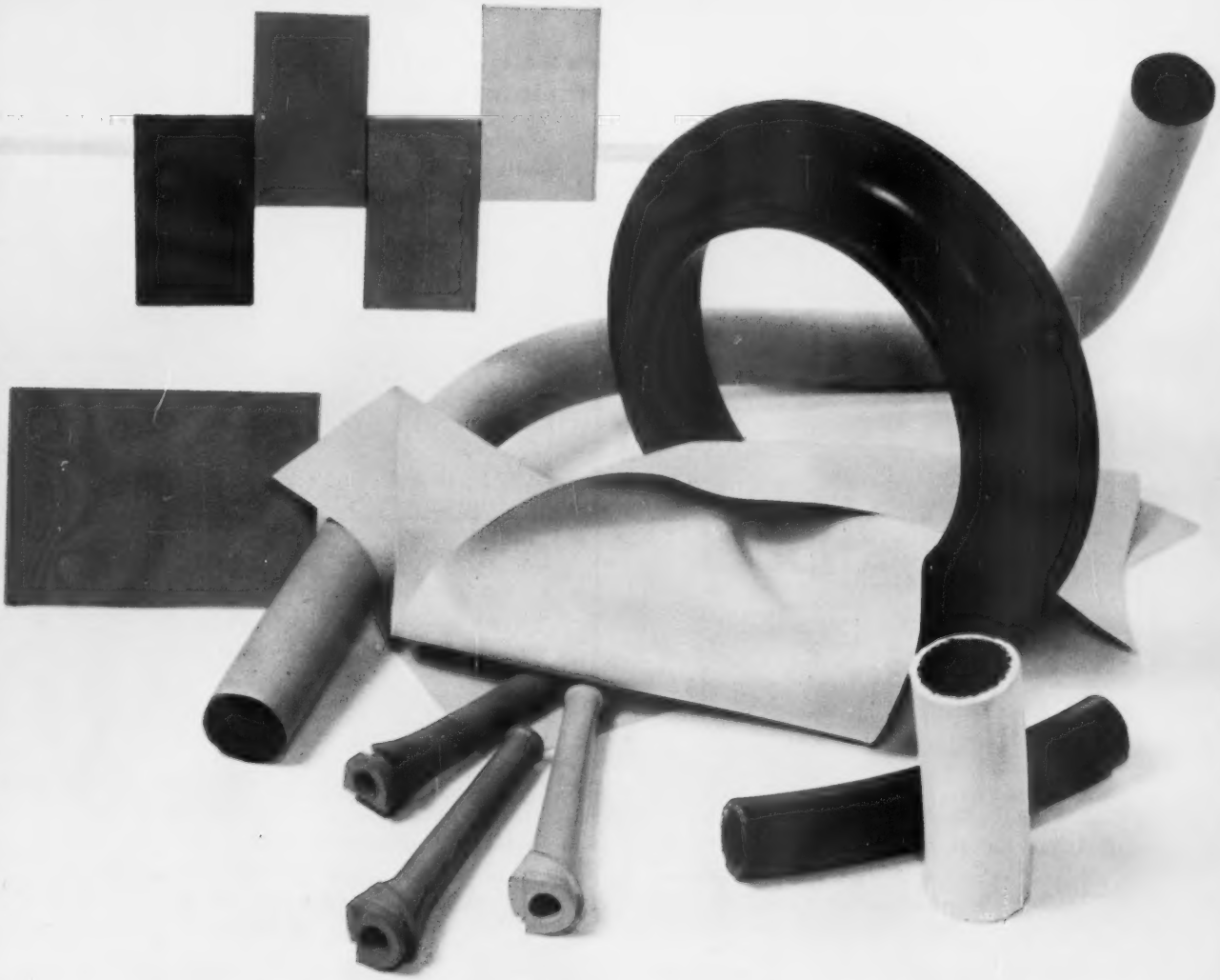
COMPANY _____

ADDRESS _____

CITY—STATE _____

Naugatuck PARACRIL OZO

THE OIL-RESISTANT, OZONE-RESISTANT NITRILE RUBBER



. . . tough, oil-proof, weather-proof and **colorful, too!**

The samples above should begin to give you some idea of the endless color possibilities in ozone-resistant rubber products made of new PARACRIL® OZO. Now you can give your product color that *sells* . . . color that identifies for coding wire and cable jacketing . . . color that blends or *contrasts* . . . color that works in a hundred ways. And you can give your product other superior properties, too.

Along with color, new weather-resistant PARACRIL OZO gives you a combination of high abrasion resistance, oil resistance, flex life and other valuable rubber properties far surpassing conventional weather-resistant rubbers.

Cast a new eye on the rubber product you make or buy. See the difference color makes. See your Naugatuck Chemical Representative or write the address below for full information on PARACRIL OZO and the advantages it offers.

Naugatuck Chemical

Division of United States Rubber Company Dept. A Elm Street Naugatuck, Connecticut

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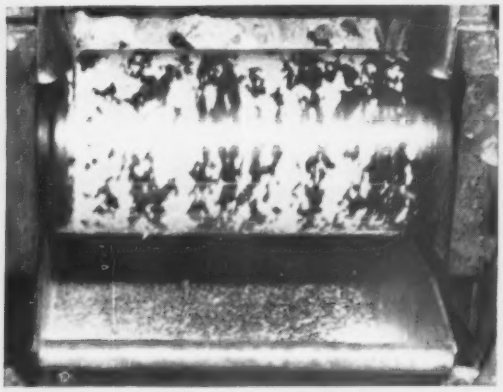

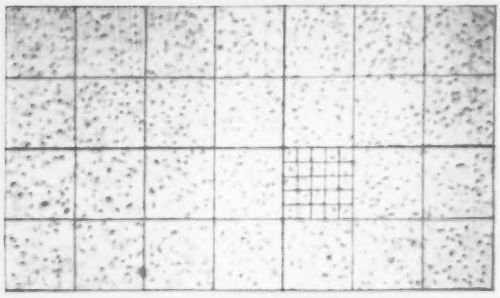

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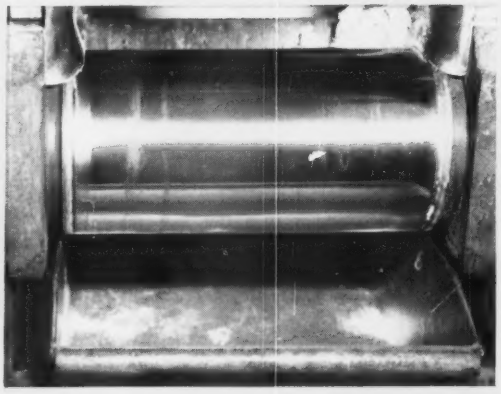

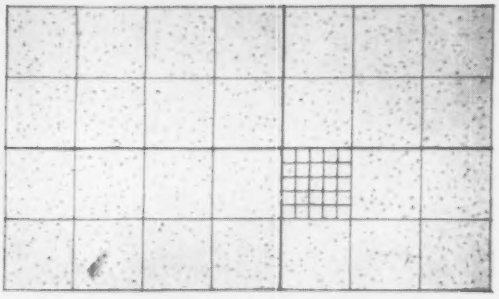

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Vulcanization of Polysiloxanes by High-Energy Gamma Radiation

By D. J. FISCHER, R. G. CHAFFEE, and E. L. WARRICK
Dow Corning Corporation, Midland, Mich.

HIGH-ENERGY irradiation of nonmetallic species causes the production of free radicals and excitation of chemical groups. The present study aims at utilization of these free radicals and excited groups for establishing cross-links in polysiloxane formulations. Fulfillment of this purpose involves a systematic review of polymer composition, temperature, presence of oxygen, crystallinity and post-irradiation time effects.

The possible existence of post-irradiation residual site activity offers at least two interesting possibilities: developing a different material for new applications, and using a post-irradiation heat treatment to increase the initial cross-linking level.

A Co-60 source was used for irradiations with gamma rays. The procedure for determining the dose followed the specifications of ASTM D-1671-59T. Doses described in this report are those absorbed in the dosimeter.

Samples of unfilled polymer as well as polymer-filler compositions were cold pressed between sheets of polyethylene coated paper, then quickly placed into the radiation field before appreciable flow was observed. Polymer-filler compositions were compounded on a two-roll mill. The compounded samples contained 35 parts of a reinforcing fume silica. The compositions were designed so crepe hardening did not occur. Vulcanization catalysts were not incorporated into any of these formulations.

The extent of vulcanization was determined by measuring the properties of tensile strength, elongation, modulus and tension set on either a Castron *(1)* or an Instron apparatus using a grip separation speed of 2 inches per minute. Tensile strength based on the reduced cross section at break (T_R) was calculated from the tensile referring to the initial cross section (T_i) and the per cent increase in elongation (E).

$$T_R = \frac{(100 + E)}{100} T_i$$

Modulus values (M) were calculated using the tensile value at 50 per cent elongation (T_{50}) in the following theoretical stress-strain relation:

$$M = \frac{T_{50}}{\left(\alpha - \frac{1}{\alpha^2}\right)} \quad \text{where } \alpha = \frac{E}{E_0} = 1.5$$

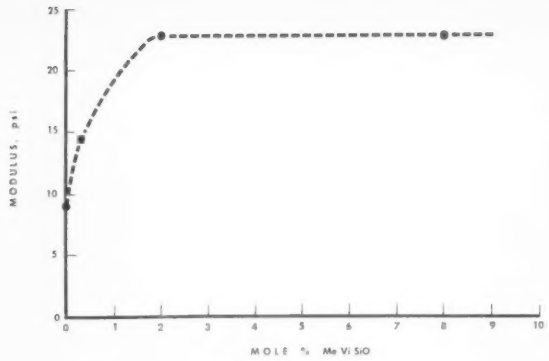

FIG. 1—Effect of vinyl content on cross-linking efficiency of unfilled polymers, using a 9.3 mr dose.

Two 50 per cent modulus measurements were taken during the course of these investigations. The first value was obtained from the tensile taken at 50 per cent elongation during the initial pull. This value was found to be directly proportional to the number of cross-links in unfilled polymers and the total number of polymer-polymer as well as polymer-filler cross-links in silica-filled polymers.

Prestressing studies on silica-filled polysiloxanes at various elongations showed that the modulus values taken from the 50 per cent elongation tensile, after a previous stretching of 400 per cent, are essentially the same as the one obtained on the unfilled polymer. Thus, the prestressed modulus is directly proportional to the number of polymer-polymer cross-links in a silica filled polysiloxane vulcanizate. This degree of prestressing, calculation of modulus and modulus proportionality to the number of cross-links agrees with the earlier study of Warrick and Lauterbur *(2)*.

Air was not excluded from the radiation vulcanizations except where specific reference is made to vacuum treatment. In such cases, the unvulcanized elastomer was placed in a capsule and evacuated before placement in the radiation field.

Radiation effects can be a function of polymer composition. Methyl, vinyl, trifluoropropyl and phenyl groups were used in studying composition variables in polysiloxanes. The inherent characteristics of polydimethylsiloxane can be changed by the incorporation of methylvinyl siloxy units in the backbone of the polymer. Modulus values which are directly proportional to the total number of cross-links in the sample are plotted in Figure 1 for unfilled polydimethylsiloxane and its copolymers, having methylvinyl siloxy units at various concentrations.

Small additions of methylvinyl siloxy units increase cross-linking efficiency while larger concentrations appear to have little additional effect at this dose level. The presence of just two mole per cent of these units in a dimethyl copolymer gives approximately three times the cross-linking level experienced with the dimethyl homopolymer.

When these polymers are compounded with silica, a different environment exists for studying the effect of radiation on the polymer. Samples of these formulations, including the first three polymers, were treated with various increments of radiation dose. The tensile at break, based on the reduced cross-section, for each sample is plotted, as a function of dose, in Figure 2. The maximum tensile at break comes at approximately 12 megarads for dimethyl siloxane homopolymer, 6 mr for the dimethyl-methylvinyl siloxane copolymer containing 0.142 mole per cent methylvinyl siloxane units, and 4 mr for a similar copolymer with 2 mole per cent methylvinyl siloxane units. The shift of the maximum to a lower dose is an effect similar to that observed in the radiation efficiency of the unfilled polymers (see Figure 1). The differences in the maximum or peak values may be explained by an uneven distribution of methylvinyl siloxane units in the backbone of the copolymer.

TABLE I—EFFECT OF PHENYL CONTENT ON RADIATION VULCANIZATION OF UNFILLED POLYMER
(7.0 Megarads)

Polysiloxane Composition	Modulus	Cross-Linking Efficiency (%)
100 M% Dimethyl	9.40	100
7.5 M% Phenylmethyl, 92.5M% Dimethyl	2.35	25
30 M% Phenylmethyl, 70M% Dimethyl	1.26	13
100 M% Phenylmethyl	0	0

TABLE II—COMPARISON OF VULCANIZATION EFFICIENCY IN SILICA-FILLED DIMETHYL AND PHENYLMETHYL HOMOPOLYMER SYSTEMS

Polymer	Dose Necessary To Obtain Maximum Tensile at Break (Megarads)
Polydimethyl siloxane	12
Polyphenylmethyl siloxane	180

Presence of Phenyl Groups

The presence of phenyl groups can greatly affect the efficiency of establishing cross-links by use of high-energy radiation. Four unfilled polymers and copolymers, varying only in phenyl content, were selected and treated with 7 megarads dose. Table I shows that the presence of the phenyl group reduces vulcanizing efficiency. If a 100 per cent efficiency for the polydimethyl siloxane is assumed, the relative efficiency of the other copolymers can be estimated for this dose increment. Pure phenylmethyl siloxane homopolymer, with its zero efficiency, suggests a radiation resistant material rather than one which can be vulcanized. Although not listed, the properties of tensile strength, per cent elongation and tension set reflect a similar behavior.

When treated with increasing amounts of radiation, the silica-filled dimethyl and phenylmethyl siloxane homopolymers also show the effect of the phenyl group's tendency to reduce vulcanization efficiency. Results of this sequence of treatment are summarized in Table II, listing the dose necessary to obtain maximum tensile at break. Polydimethyl siloxane is 15 times more efficient than polyphenylmethyl siloxane; in fact, the existence of cross-linking could not be observed in the latter system with doses less than 80 megarads.

The silica-filled polysiloxane formulation containing polytrifluoropropylmethyl siloxane gave unexpected results when it was treated with various increments of gamma irradiation in air. Poor physical properties were obtained; indeed it was impossible to get any appreciable strength or reproducible properties under these conditions of treatment. Good vulcanizations were effected, however, when samples of the same formulation were placed in glass tubes, then evacuated for 10 and 30 minutes at 0.5 mm (Figure 3). The longer evacuation of 30 minutes shifted the peak of the tensile at break curve to one megarad, also increasing the maximum strength at break. Better evacuation techniques might increase this maximum value as well as shifting its peak to a lower dose.

The one megarad results on this polytrifluoropropylmethyl siloxane, and the previous trend toward lower dose through use of methylvinyl siloxane units, show that polymer composition is an important variable in obtaining efficient vulcanizations with gamma radiation. Table III points this out for all the silica-filled polymers studied in this work. The fourth column of this table shows the relative efficiency of radiation vulcanization for these polymers. This efficiency, based on maximum strength per unit of radiation dose, shows that polytrifluoropropylmethyl siloxane has the highest value.

Post-irradiation residual site activity has been a special part of this research on vulcanization of polysiloxanes by high-energy radiation. In order to see what magnitude exists, as far as time effects are concerned, the physical properties of several series of samples were measured six months after they had been irradiated. These data show that each of the physical properties—tensile, elongation, tension set and modulus—indicates a significant increase in density of cross-links. Figure 4, indicating tensile at break versus radiation dose for silica-filled polydimethyl siloxane, is a good example of these effects.

Figure 5 isolates the change in modulus during the six-month period for this same polymer at doses 1.0 through 20 megarads. At low and intermediate doses, the residual site activity makes a major contribution

TABLE III—OPTIMUM DOSE FOR MAXIMUM TENSILE AT BREAK IN SILICA-FILLED POLYSILOXANE SYSTEMS

Polysiloxanes	Optimum Dose (I) (megarads)	Max. Tensile at Break (II)	Ratio II/I
100 M% Phenylmethyl	180	970	5.4
100 M% Dimethyl	12	9,000	750
0.142 M% Methylvinyl, 98.858 M% Dimethyl	6	7,800	1,300
Trifluoropropylmethyl	1	4,500	4,500

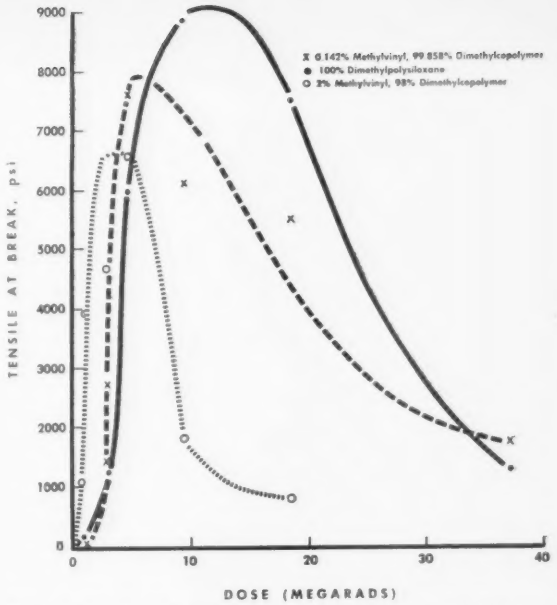

FIG. 2—Tensile at break shown for silica-filled dimethyl and methylvinyl siloxane copolymers.

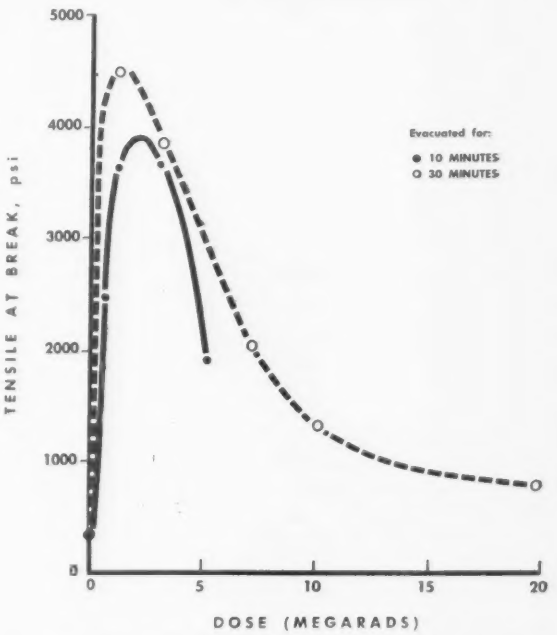

FIG. 3—Tensile at break given here for silica-filled trifluoropropylmethyl siloxane.

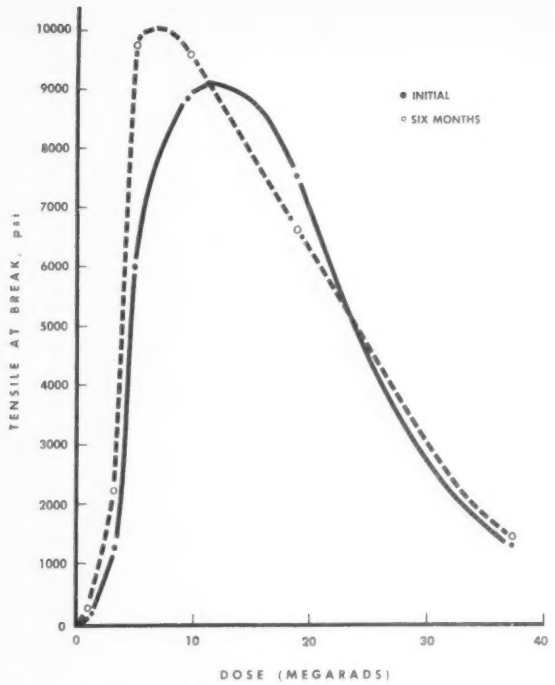

FIG. 4—Broken line shows six-month time effect on tensile at break of silica-filled polydimethyl siloxane.

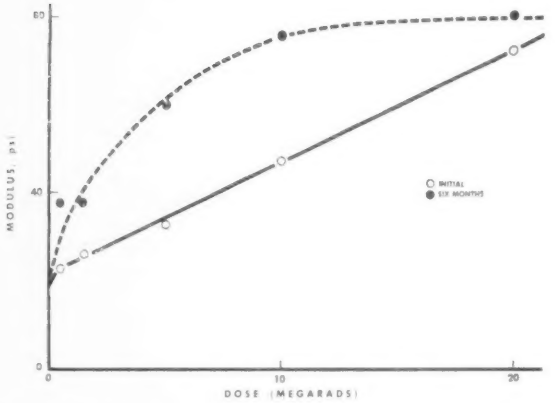

FIG. 5—Modulus curves depict post-irradiation effects on silica-filled polydimethyl siloxane.

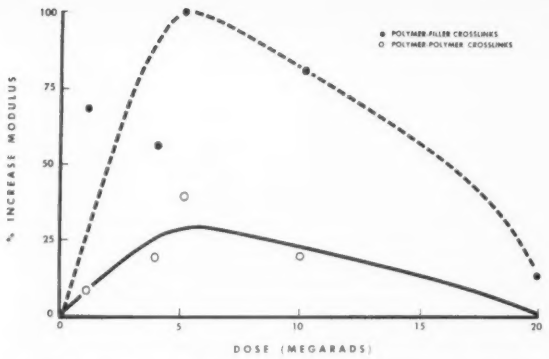

FIG. 6—Two curves highlight the six-month effect on polymer-polymer and polymer-filler cross-links.

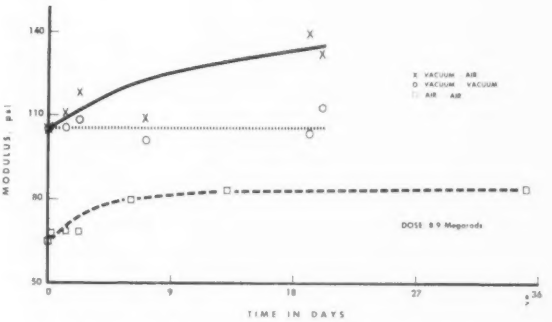

FIG. 7—Graphically shown here: differential effect of air on the time effect of silica-filled polydimethyl siloxane, using room temperature irradiation.

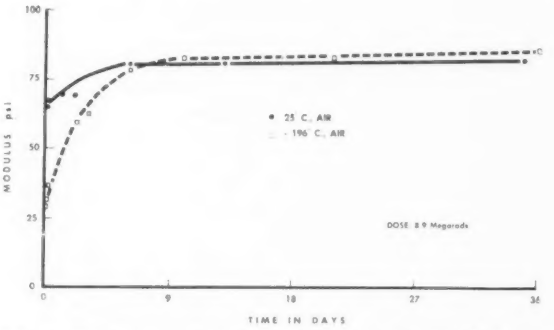

FIG. 8—These curves show the further effect of crystallinity on time effects of silica-filled polydimethyl siloxane.

to the total number of cross-links. At the high dose of 20 megarads, only a small fractional increase exists.

The initial modulus can be considered a measure of the total number of cross-links of polymer and filler. It includes polymer-polymer and polymer-filler cross-links. The time effect increases due to each of these contributions is shown in Figure 6. The increase in modulus for the polymer-polymer cross-links was taken on irradiated unfilled polymer samples. The modulus values on these samples were then subtracted from the corresponding filled-stock modulus in order to calculate the polymer-filler cross-links.

How quickly does the time effect observed in the six-month data establish itself? The lower curve in Figure 7 shows that silica-filled polydimethyl siloxane experiences a change in modulus from 65 through 83 psi in 13 days. These data indicate that the residual site activity appears to have ceased after that time period.

To gather additional data for isolating the time

TABLE IV—INITIAL AND PRESTRESSED MODULUS TIME EFFECTS ON SILICA-FILLED POLYDIMETHYL SILOXANE

(Irradiated, 9.0 Megarads at Room Temperature)

Time (days)	Elongation (%)	Tension Set (%)	Maximum* Tensile (psi)	Modulus (psi)	Prestressed** Modulus (psi)
0	1095	8	972	36.8	17.5
¼	1077	6	1005	44	18.2
1-5/24	971	10	979	46	18.4
2	1049	10	1061	52	19.4
5	935	3	1051	55	21.3
8	936	2	1073	58	22.0
16	883	3	1133	68	23.4
41	845	1	1184	78	26.3
109	790	3	1216	88	28.7

* Based on initial cross-section.
** Prestress was 400% elongation.

effects associated with polymer-filler and polymer-polymer cross-links in the same samples, a series of initial and prestress modulus measurements were made. Table IV shows that the initial modulus (proportional to the total number of cross-links) and the prestressed modulus (proportional to the polymer-polymer cross-links) both increase as a function of time.

Additional Experiments

In order to isolate variables which may contribute to such time effects, several additional experiments were conducted. The first experiment involves isolating the effect of air or oxygen on the sample. A comparison of the two upper curves in Figure 7 with the lower air-air curve shows the significance of its role. The upper curves include physical properties on samples that were placed in capsules and evacuated before they were irradiated. After irradiation, one half of the samples were opened to the air, while the remainder were left in the sealed capsules until their properties were measured.

If oxygen or air is excluded during and after irradiation at 25° C., time effects apparently do not exist. The effect of air on the sample, that was irradiated in vacuum and then exposed to air, is appreciable. These results lead us to believe that a residual site, produced in the sample during irradiation, can use air thus contributing to the establishment of additional cross-links. An alternate mechanism for creating cross-links in vacuum does not seem to exist.

The above-mentioned samples were given the same dose. A much higher degree of cross-linking, 110 to 130 psi, was obtained in the evacuated samples than the ones exposed to air, which had values of 83 psi. In order to duplicate the initial air effect, two additional samples were prepared and treated with radiation — one in air and one in vacuum. Approximately twice as many cross-links were obtained in the evacuated sample, as is evident by comparison of the moduli in Table V. The increase in modulus is accompanied by a 40 per cent reduction in elongation without any change in tensile. Therefore, the elimination of air can increase the efficiency of radiation vulcanization of polydimethyl siloxane.

Crystallinity is known to affect cross-linking efficiency in organic polymers, so the following experiment was designed to see if similar effects exist in silicones: Cold pressed samples of silica filled polydimethyl siloxane were immersed in liquid nitrogen contained in a glass Dewar. Earlier work *(3)* shows that this treatment, which is below the published freezing point, insured the existence of crystallinity.

The Dewar was placed in the radiation source. After irradiation, the samples were removed from the Dewar, warmed to room temperature and their physical properties measured as a function of time. Figure 8 shows the initial physical properties to be less than those of the sample treated with radiation at 25° C., while the total number of cross-links established after nine days are similar. This type of behavior could be interpreted as indicating the existence of a new residual site which contributes to cross-linking.

The amount and distribution of crystallinity during this kind of treatment is difficult to estimate and repeat; however, two additional experiments were conducted with crystalline samples: Two groups of cold pressed silica filled polydimethyl siloxane samples were placed in glass capsules, evacuated and sealed, then lowered into two Dewars filled with liquid nitrogen. After irradiation at —196° C., one group of samples was opened to the air, while the other re-

TABLE V—EFFECT OF AIR ON RADIATION VULCANIZATION OF SILICA-FILLED POLYDIMETHYL SILOXANE

	Irradiated in Air	Irradiated in Vacuum
Elongation (%)	1041	628
Tension Set (%)	3	0
Maximum Tensile for Initial Cross Section (psi)	1038	1043
Modulus (psi)	62	111
Radiation Dose (megarads)	8.9	8.0
Time after Radiation	0	0

TABLE VI—VULCANIZATION OF SILICA-FILLED POLYDIMETHYL SILOXANE AND ITS PHENYLMETHYL COPOLYMER

	Polydimethyl siloxane, 8.9 Megarads	
	25° C	—196° C
Elongation (%)	1041	1284
Tension Set (%)	3	37
Maximum Tensile (psi)	1038	705
Modulus (psi)	62	27
Tensile at Break (psi)	11,840	9,760

	Poly (7.5 Phenylmethyl, 92.5 Dimethyl) Siloxane, 9.2 Megarads	
	25° C	—196° C
Elongation (%)	1161	1368
Tension Set (%)	9	25
Maximum Tensile (psi)	657	401
Modulus (psi)	22	22
Tensile at Break (psi)	8,285	5,887

mained in the sealed capsules. Time effect studies at 25° C. for both series of samples (Figure 9) show an increase in modulus from the time they were brought to room temperature. Since the doses were not equivalent for the two series, the modulus values for the larger dose series were consistently greater.

After elevating the dose and modulus values of the above data to 8.9 megarads, a comparison of the time effects on samples irradiated at crystalline and room temperature reveal two additional facts: first, the magnitude of modulus values for the crystalline irradiated samples, after time effects are complete, are similar to those of air irradiated samples, but much less than vacuum irradiated samples at room temperature. This may imply that the polysiloxane crystallites are acting like energy "sinks" or antiradiation effect additives. Second, a time effect exists in the crystalline samples stored in a vacuum after irradiation. This observation differs from that obtained with the room temperature treatment, and indicates a different type of residual site.

Earlier Crystallization Studies

Earlier studies on crystallization *(3)* have shown that polydimethyl siloxane crystallizes before it reaches its second-order transition, while a 7.5 phenylmethyl, 92.5 mole per cent dimethyl siloxane copolymer is known not to crystallize *(4)*. The copolymer changes directly to a glass as its temperature is lowered below its second-order transition.

In order to see whether there is evident a unique contribution from crystallites in a polydimethyl siloxane at —196° C., it was compared with phenylmethyl copolymer which does not crystallize. Table VI shows that after irradiation the filled polydimethyl siloxane has a modulus of —196° C., which is less than one half that obtained by irradiation at 25° C. This is not the case with the phenylmethyl copolymer formulation whose modulus is the same for both treatments. In each case, modulus values were determined immediately after irradiation. In this way, crystallinity was isolated and shown not to aid but to hinder establishment of cross-links during radiation treatment.

Even though there is no change in the modulus of the phenylmethyl copolymer, its tensile at break is

TABLE VII—TIME EFFECTS ON 7.5 PHENYLMETHYL, 92.5 DIMETHYL, SILICA-FILLED POLYSILOXANE

	Irradiated at —196° C., 9.2 Megarads								
Time (days)	0	1/8	1	4	8	13	25	29	111
Elongation (%)	1368	1387	1278	1295	1234	1224	1230	1198	1199
Tension Set (%)	25	23	23	26	25	26	22	19	20
Maximum Tensile (psi)	401	431	455	485	453	460	494	457	460
Modulus (psi)	22	23	27	29	32	32	34	36	40
Tensile at Break (psi)	5887	6409	6270	7251	6043	6090	6570	5932	5975
	Irradiated at Room Temperature, 9.2 Megarads								
Time (days)	0	5/24	3	5	10	13	21	45	101
Elongation (%)	1161	1175	1106	1128	1183	1133	1086	1051	1060
Tension Set (%)	9	7	5	8	12	10	6	7	8
Maximum Tensile (psi)	657	737	773	810	701	717	888	913	829
Modulus (psi)	22	26	29	28	32	28	32	38	34
Tensile at Break (psi)	8284	9397	9322	9947	8994	8841	10532	10509	9616

TABLE VIII—ACTIVATION OF RESIDUAL SITES IN IRRADIATED UNFILLED POLYSILOXANES BY HEAT TREATMENT

Sample	Radiation Dose (megarads)	Temp. (°C.)	Heating Time	Modulus Initial (psi)	Modulus Heat Treatment (psi)	Modulus Increase (%)
Polydimethyl Siloxane	1.62	142	1 hr.	1.1	2.0	82
8 % Methylvinyl Siloxy Copolymer	1.62	142	1 hr.	3.7	4.3	16

TABLE IX—EFFECT OF POST-IRRADIATION HEATING ON SILICA-FILLED POLYDIMETHYL SILOXANE

	8.9 Megarads		
	Initial	Room Temperature Time Effect (2 hrs.)	Immediate Post-Heating (2 hours at 150° C.)
Elongation (%)	1041	990	912
Tension Set (%)	3	4	6
Maximum Tensile of Initial Cross Section (psi)	1038	1003	1149
Modulus (psi)	62	63	84

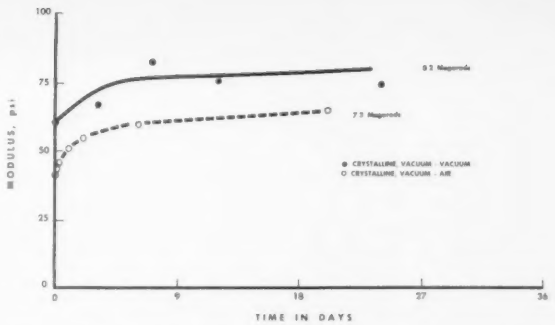

FIG. 9—Differential effects of crystallinity and vacuum on time effects of silica-filled polydimethyl siloxane.

affected by temperature of irradiation. The tensile at break of the sample irradiated at room temperature is greater than the one's irradiated at the low temperature. If the effect of crystallinity is ignored, this is also true for the polydimethyl siloxane system. The reasons for these results are not clear; however, Russian workers *(5)* have shown that higher tensile strength at break are obtained in vulcanization treatments, where the polymer exists in an extended configuration, rather than in a coiled structure. Conceivably, 25° C. vulcanizations took place on more extended or uncoiled polymers than the —196° C. vulcanizations.

A study of the time effects of this phenylmethyl copolymer at both temperatures of irradiation reveals that the increase in the number of cross-links is similar (Table VII). Such behavior is unique for this copolymer because, after the same treatment, the polydimethyl siloxane showed a difference in initial modulus which disappeared after appreciable aging at room temperature.

A qualitative check on the possibility of increasing the number of cross-links by heating samples immediately after they were irradiated was conducted with unfilled polydimethyl siloxane and copolymer of dimethyl, with 8 mole per cent methylvinyl siloxane units. Table VIII shows two sets of modulus values: one taken within a 15-minute period after irradiation, and the other after a consecutive heat treatment. An increase in modulus was observed for each sample. The same experiment was then conducted with silica-filled polydimethyl siloxane. A 35 per cent increase in modulus was obtained (Table IX), along with an increase in tensile strength and a decrease in elongation similar to that observed in peroxide-vulcanized stocks receiving additional heat cure.

Residual Site Utilization

The experiment was designed further to elucidate utilization of these residual sites. Table X lists the room-temperature time effects on a silica-filled polydimethyl siloxane sample, after it was irradiated at —196° C., and then divided into two series. One series was aged at room temperature, while the other was heated at 150° C. after different increments of aging at room temperature. The first high-temperature treatment of this low-temperature irradiated stock gave a 91 per cent increase in modulus. Subsequent heat treatment on the room-temperature aged samples gave similar physical properties. A close look at physical properties of the heat-treated samples reveals that they are superior to the ones obtained after aging at room temperature for 111 days.

TABLE X—EFFECT OF HEATING SILICA-FILLED POLYSILOXANES IRRADIATED AT —196° C; 9.2 MEGARADS

	Room Temperature Time Effects				
Time (days)	0	1	13	28	111
Elongation (%)	1228	1196	1132	1285	1106
Tension Set (%)	9	10	8	15	14
Maximum Tensile of Initial Cross Section (psi)	892	984	1029	1030	1043
Modulus (psi)	36	45	55	52	64

	Room Temperature Time Effects Plus 105 Minutes at 150° C.			
Time (days)	1/6	4	13	28
Elongation (%)	954	938	986	1084
Tension Set (%)	5	7	8	4
Maximum Tensile of Initial Cross Section (psi)	1122	1170	1151	1152
Modulus (psi)	71	75	71	67

The composition of the polysiloxane is a major factor affecting the efficient utilization of high-energy radiation for vulcanization. High-phenyl containing polymers do not vulcanize efficiently by radiation, while demethyl and dimethyl-methylvinyl polysiloxanes vulcanized quite readily. The polytrifluoropropylmethyl siloxane can also be vulcanized by radiation, using vacuum, to give good physical properties. Crystallinity has a negative effect on the efficiency of vulcanization, while the elimination of air has a definitely positive effect on non-crystalline samples.

Two kinds of residual site activity were observed: one utilizing air, another not requiring air to produce a cross-linking reaction. The site which utilizes air probably gives a cross-link by means of oxygen in the form of a peroxide or hydroperoxide, while the low temperature site may involve direct cross-linking initiated by a free radical that exists on the polymer.

Production of residual sites in polysiloxanes yields a new material. However, utilization of this material's unique character is limited to several days.

Cross-linking efficiency obtained with room-temperature, gamma radiation treatment can be increased by post-heating, which essentially uses all of the radiation-induced residual sites.

Although this report does not show any unique property advantages other than residual site activity, the reported properties of tensile, elongation and modulus are equivalent to and perhaps slightly better than other vulcanizations and cures.

ACKNOWLEDGEMENT

The authors wish to acknowledge the assistance of Dr. David E. Harner, of the Dow Chemical Company, in directing treatment of samples with Co-60 gamma rays.

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Coming Soon . . .

Vulcanization of Polysiloxanes: Accelerated Electrons and High Temperature Ambients—By David J. Fischer and Vernon Flegel, Dow Corning Corp., Midland, Mich.

The purpose of this paper is to study individually and simultaneously the effect of intensity and temperature on the efficiency of vulcanization by accelerated electrons and to compare these treatments with the effects of equivalent Co^{60} irradiation.

Heat Resistant Properties of Fluorel Elastomer Under Extended Conditions—By D. A. Stivers, Don L. Peterson, and Galen R. Meier, Chemical Division, Minnesota Mining & Manufacturing Co., St. Paul, Minn.

Data showing heat resistance of a high-temperature, fluid-resistant elastomer, and how they can be used in predicting properties at intervals up to maximum life in the range 450°F. to 700°F.

Engineering Factors in Coating with Silicone Rubber for High Temperatures—By H. I. Silversher, R. C. Shaffer and R. A. Landry, Western Backing Corp., Culver City, Calif.

When glass cloth is combined with a silicone compound, the resulting product derives mechanical strength from the glass in addition to flexibility and protection from the rubber.

The Role of Carbon Black in the Thermal Oxidation of Polyolefins—By W. Lincoln Hawkins, Bell Telephone Laboratories, Murray Hill, N. J.

The ability, exhibited by many carbon blacks, to inhibit the free radical oxidation of polyolefins is dependent on the presence of certain reactive groups on the surface of the carbon particles. Heating in the presence of oxygen or sulfur increases the number of reactive groups to produce a much more effective antioxidant.

PLUS R/A SPECIAL INDUSTRY REPORT

Music for the Rubber Production Line

Pleasant listening may mean greater efficiency and higher output, according to recent psychological studies. The objective is to soothe the harried worker without putting him to sleep.

The Vulcanized-on-Sole Process:

MECHANICAL REQUIREMENTS

First of a four-part series on a vital development in rubber-bottomed footwear

By A. W. NICONCHUK
United Shoe Machinery Corp., Beverly, Mass.

THE MOLDED-ON process has been described quite thoroughly by several authors *(1, 2, and 3)*. The research team at the United Shoe Machinery Corp., Beverly, Mass., conducted a study of the process with a British United Vulcanizing press (BUVP). The essential features of this outsoling process consist of: (1) preparation of suitable soling material, (2) properly prepared leather uppers, (3) techniques of combining the first two steps by means of the BUVP machine.

An extensive coverage of elastomeric soling materials appears later in this report. The shoe uppers used in this study were prepared by the USMC Shoe Laboratory. The majority of them were made from ACL Keena leather, chrome tanned, HH wt., 7 to 8 per cent oil content, with a 9½ iron-chrome, retan insole.

The uppers were Army-type, size 9, Fort Knox lasted, flat, and tacked all around. Other leathers investigated included ACL Fina, ACL Melgo, ACL Glasco, and treated leathers such as Bevon, Sylflex, Trostel and Quilon. Different shoe constructions handled successfully by the process will be discussed in the next article.

The BUVP is a hydraulically operated press for molding, vulcanizing and attaching rubber soles and heels in one operation to men's, women's and children's footwear. Each press produces a pair of shoes. For the purpose of this study, the essential features of the BUVP include: a metallic footform with foreshortening device for positioning a shoe upper in the mold, heated side molds and sole mold, a pressure mechanism, and a timing device.

A hydraulic and timing unit provides power to operate the press, also regulating the timing sequence of press motions. The power unit is capable of exerting sole mold pressure in the range of 75 to 700 psi. One such unit can accommodate nine presses, as shown in Figure 1. A close-up view of a single press with its power unit is shown in Figure 2.

The operation of the BUVP is quite simple. In the "rest" position, footforms are presented to the operator in a vertical plane with the toe uppermost to facilitate placement of uppers and removal of bottomed shoes. Uncured rubber in blanks or pellets is placed in the mold cavity, then foot forms are positioned above the molds. Next, the fully automated machine cycle is set into operation by tripping a single hand lever. Footforms with properly prepared uppers are lowered into position, the side molds with attached welt plates closing around the feather-edge of the uppers to ensure a tight seal. Meanwhile, by means of a preselected timing device, the bottom

Water-Resistant Footwear . .

. . . has been produced by a New England research team using equipment developed in Britain to mold rubber soles directly to uppers specially treated with silicone emulsion. A shoe produced in this way provides a higher level of water resistance than has previously been possible.

The research described in this and the following three installments was concerned primarily with creating and testing a prototype — the heavy industrial type of shoe discussed in the opening paragraphs. Once this has established itself, however, the technique will be used to turn out a variety of other models in volume.

This part of the report introduces the research method with an account of materials, equipment and methods. Part Two will discuss rubber compounding; Part Three, adhesives and curing requirements; Part Four, special studies and general conclusions.

FIG. 1—Nine presses, each turning out one pair of shoes per cycle, are operated by a single power unit and timing device.

ram exerts a low pressure to preheat the rubber, then a high pressure for proper molding, vulcanizing and attachment to uppers. At the end of the preset curing cycle, the side molds open the sole mold retracts, and the heads lift the footforms to permit removal of the bottomed shoes. Figure 3 shows a recently installed low-pressure vulcanizer (BUVP-LP).

The physical dimensions of the cured shoe bottom is governed by mold design, stock loading and curing pressure. The BUVP used in this study was equipped with size 9 molds. Figure 4 illustrates mold style and dimensions in diagrammatic view. The cleat-type tread provides a greater surface contact area with a pronounced effect on cure time.

Figure 5 represents actual cross sections of vulcanized soles, pointing up the dimensional difference between smooth and cleat designed sole-molds. The latter have a 30 per cent greater surface contact area which reduces cure time by approximately two minutes.

Early investigation indicated that good molding of outsoles involved two important factors: proper stock loading and mold design. The first depends on the shape and thickness of the rubber biscuit used, and on singular rather than plied-up stock. A common European practice utilizes the boomerang-shaped sole piece and circular heel piece, as shown on the left part of Figure 6. It aims at material conservation by the shoe manufacturer during dinking out from slab stock. This type of mold loading results in improper distribution, attended by heavy flash in the shank and "starved" forepart, particularly at extensions and toe area.

We found that best results were obtained by using sole and heel blanks that conform to the shape of the bottom pattern. Sole and heel pieces undercut by ¼ inch gave excellent results, as is illustrated in the right hand drawing of Figure 6.

One-piece sole and one-piece heel biscuits of uniform thickness proved advantageous in minimizing air entrapment. For size 9 molds, sole biscuits were dinked out of calendered sheets approximately ½ inch thick. The heel biscuit, approximately twice as thick, could not be calendered on our equipment; however, a two-ply laminate of properly compounded rubber did mold satisfactorily.

Mold design plays a paramount role in good bottom molding, particularly with intricate tread patterns. The tread pattern must be designed to prevent air entrapment and the voids and poor appearance it entails. Tread projections such as cleats, if properly vented, reduce air pocketing. Venting alone does not insure proper cleat molding unless the sole mold delivers

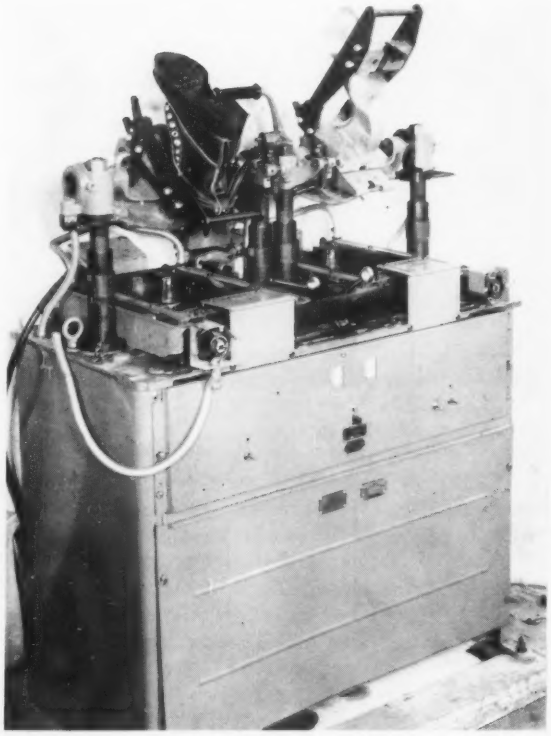


FIG. 3—A recent modification of this novel shoemaking process uses the low-pressure vulcanizing unit shown above.

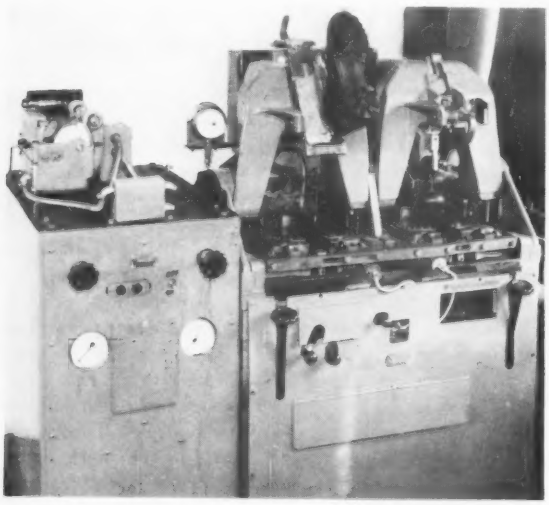


FIG. 2—A close-up shows the power unit together with one of the presses used in vulcanized sole manufacturing.

uniform, instantaneous pressure to the soling stock.

Adequate and uniform clearance between sole mold and side molds serves as one means of controlling rubber flash during the vulcanizing interval. Other contributing factors were dual pressure system, stock plasticity, chemical composition of soling stock, as well as stock loading and distribution.

A full scale investigation of the molded-on process by the United Shoe research team was begun early in 1957, using the BUVP and natural rubber soling compounds provided by the British Dunlop Company. It soon became apparent that certain stock requirements were essential to the process. These requirements included: stock moldability (plastic flow), complete cure within prescribed time cycle, and bondability to uppers.

We cannot overemphasize the need for proper shoemaking technique in the molded-on process. Upper construction and preparation are critical factors in making a quality product. Some of the key requirements are listed below:

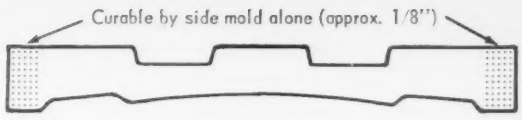
¶ Uppers must be lasted to fit the mold opening so that side mold welt plates close completely, embedding halfway up the insole edge, thereby ensuring a complete seal. A poor edge seal would detract from appearance and require spew trimming.

¶ Insole length must conform to the metal foot form, with over-all shoe length maintained constant.

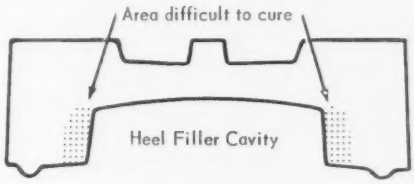
¶ Chrome-tanned uppers and insoles should be used to resist the heat of molds (300°-345°F). A study was made of the effects of heat, pressure and moisture on upper leather.

¶ Lasting margin must be roughed to the welt-plate bite line for maximum adhesion of sole to upper. Neither the rubber soling stocks nor the adhesives investigated would adhere to the leather finish. This was most pronounced for treated leathers such as Bevon (high oil content), Sylflex (silicon oil impregnated), and Quilon. Vulcanizable leather, such as Trostel, was an exception, because it contains a curable polymer in the finish and shows good bondability without roughing or adhesives.

Over-roughing necessitates after-finishing. Exactness in roughing can be realized by the guideline method, that is, pre-closure of welt plates around upper. Although a suitable laboratory method, this additional step in the procedure is frowned on by



1. Cross section - BUVP vulcanized Sole, center forepart (Size 9)



2. Cross section - Heel (Size 9)

3. Cross section - Sole, flat bottom mold (Size 8)

FIG. 5—A series of cross section diagrams show the difference between smooth and cleated soles developed in the research program.

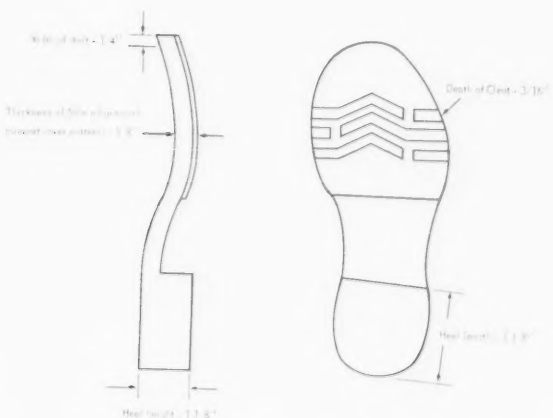


FIG. 4—These drawings give a diagrammatic view of the special size 9 molds in the basic prototype portion of the study.

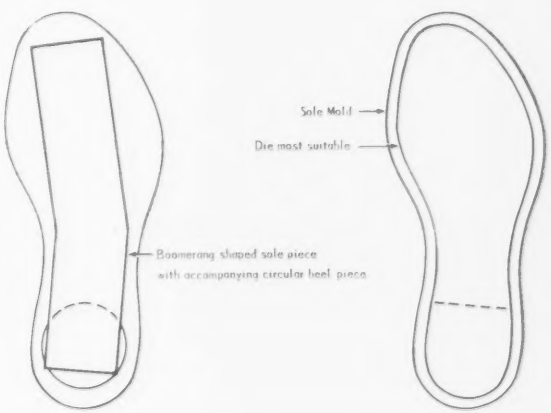


FIG. 6—New design (right) was found to give much better results than the design it replaced (left).

the shoe industry. Industrial practice relies on operator skill for roughing accuracy.

¶ Thorough low speed bottom roughing. High speed roughing has a tendency to burn or harden the leather making it less receptive to absorption of adhesives.

¶ Adequate lasting margin for attachment of bottom to upper. A minimum of ¼" width is required and ½" width is preferred.

¶ Flat lasted upper with a minimum of pleats in the toe area. Heavy pleats prevents adequate roughing of finish which in turn minimizes bond at the critical toe area.

¶ Use of molded counters and uniform box toe weights.

¶ Trimmed insole heel seat.

¶ Conventional lasting techniques.

¶ As pointed out above, specially built uppers were the chief subjects for study. However, other shoe constructions were successfully made on the BUVP, including combat boots; 6-inch boots with Bevon, Trostel and Quilon leathers; army-style oxfords, ACL 5½ oz. work Elk with Ferros Flex 6½ iron-chrome tan insole; ACL leather, welt-shoe uppers lasted to conventional welt insole without welt; army-type oxfords with flat ribs; special construction with flat ribs; GW welt, canvas tape reinforced uppers, close trimmed.

Seven additional types were: GW welt, canvas-covered, perforated-welt types, reinforced with medium trim; cement and staple lasted uppers; flat rib, stapled and cemented down, canvas rib with reinforced core attached to lasting margin; perforated welt, ½ channeled, innersole welt, stapled UWM; toe staple-lasted to channel-rib by Model B-TLA; flat-lasted with cement, Littleway attached midsole (4 iron), and welt process with direct molding to rubber midsole.

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Jumbo Bins Simplify Handling Of Rubber Parts

HANDLING and storage of many rubber parts for wheeled products is simplified with notable economies at the Hammond, Ind., factory of the American Machine and Foundry Co., Junior Toy Division. Rubber tires for wheeled toys are received from the Swan Rubber Co., Carey, Ohio, bulk-packed in jumbo wirebound pallet bins holding 600 or more pounds per container. Frequently carried by fork-lift truck directly to assembly lines, the contents are instantly available to workers.

The tires are subject to a quick and accurate check and count as they are carried from the truck that delivers them. Adoption of wirebound pallet bins eliminates, among other things, the purchase cost of small containers, packing man-time, and time-consuming storage and truck loading operations at the Swan plant. The nuisance and expense of handling, unpacking and disposing of multitudes of small packages is eliminated at customers' plants.

Rubber products, such as hollow tires, compress of their own weight when packaged. Pressure is created within the package, which often causes it to burst. This is particularly so during humid weather or if packages get damp while being loaded or unloaded. Stacks of cartoned rubber goods often toppled and spilled even before shipment.

The factory manager of the Junior Toy Division, described the economies in man-time and handling costs at the Hammond plant as "very important". An additional advantage of packing tires in bins, he said, is the elimination of distortion to tires. This sometimes occurs when tires are bundled together by means of cord or tape. Tires shipped in pallet bins are simply placed. Without being bundled or cartoned, there is little chance for distortion out of round.

Considerable storage area is saved by being able to high-stack packed bins safely in minimum space. Inventory is quick and inexpensive since each bin is labeled plainly with the number, size and type of its contents. Empty bins are dismantled quickly by cutting binding wires at one corner, disengaging the one-piece blank that forms the sides, folding the blank flat, and stacking blanks and bases aboard a truck.

New tires are packed in jumbo "Power Pack" pallet bin as they come off production line at Swan Rubber Co.

LOW DUROMETER

Cast Urethane Elastomers

By H. L. HEISS

Mobay Chemical Co., New Martinsville, West Va.

Lab results show catalysts, cure rates, may determine commercial potential

THE SUBJECT of this article is cast urethane elastomers exhibiting hardness values below 60 on the Shore A-2 scale. These materials, usually prepared with the 80-20 isomer ratio of tolylene diisocyanate (TDI), are quite distinct from the harder types normally containing p,p′-diphenylmethane diisocyanate (MDI), 1,5-naphthalene diisocyanate (NDI) or, in rare cases, TDI. Table I compares typical values for the hard and soft cast urethanes.

The hard polymers combine resiliency, abrasion resistance, and extreme toughness and so find use in solid tires, bearings, and vibration-absorbing mounting blocks. They are usually based on linear polyesters of the poly(ethylene adipate) type, and this, together with their higher isocyanate content, makes them relatively expensive.

The soft urethanes are of interest because they provide good low-temperature properties, electrical properties, and resistance to solvents and chemicals. Current uses include encapsulating resins, sealing or caulking compounds, printing rolls, and binders in solid rocket propelants. Since they contain less isocyanate and may employ the inexpensive polyether glycols, these products cost less than the hard polymers. It should be pointed out that polymers based on polyethers lack stability at temperatures around 100° C. unless certain precautions are taken, as discussed below.

Cast urethanes can be prepared by either the propolymer or direct techniques which have been discussed in previous literature *(1 to 8)*. The techniques may be summarized as follows:

Three Basic Casting Methods

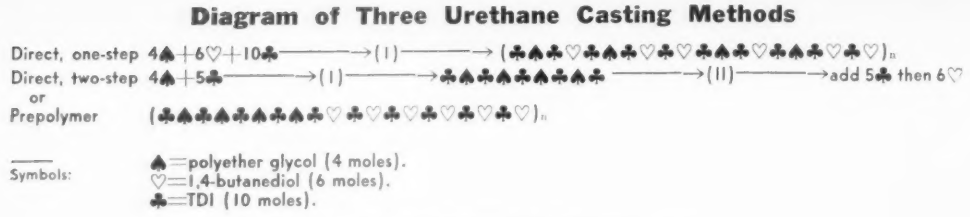
Prepolymer—A polyether glycol or polyester is reacted with excess (usually 40 to 200 per cent) diisocyanate to form an -NCO terminated prepolymer, a stable product not necessarily produced at the casting site. The liquid prepolymer is converted to a urethane elastomer by reaction with a curing agent (also referred to as "chain extender" or "crosslinker") which is usually a diol, hydroxylamine or diamine.

Direct Method, Two Step—Similar to the prepolymer method, except that the prepolymer formation (first step) occurs at the casting site, immediately followed by the cure to a solid elastomer (second step). This approach is often successful with prepolymer species which tend to polymerize, separate or otherwise deteriorate during storage.

Direct Method, One Step—All the components are added at the same time, and random reaction occurs to polymerize the fluid materials to the desired elastomers. This method is the simplest, but also affords the least control over polymer structure. It is often used where only two reactants are employed at a stoichiometric ratio.

The technique selected will depend on equipment available, desired time cycles and the formulations used. For certain purposes a block polymer is preferred; when using more than two components it can be produced by the prepolymer or two step methods, as the following diagram demonstrates.

Diagram of Three Urethane Casting Methods


Direct, one-step 4♠+6♡+10♣ → (I) → (♣♠♣♡♣♠♣♡♣♡♣♠♣♡♣♠♣♡♣♡)n
Direct, two-step 4♠+5♣ → (I) → ♣♠♣♠♣♠♣♠♣ → (II) → add 5♣ then 6♡
or
Prepolymer (♣♠♣♠♣♠♣♠♣♡♣♡♣♡♣♡♣♡♣♡)n
Symbols:
♠=polyether glycol (4 moles).
♡=1,4-butanediol (6 moles).
♣=TDI (10 moles).

While the one step product has aromatic TDI nuclei and polar urethane groups distributed at random along the polymer chain, such is not the case in the two step method. Here, by proper choice of reactant addition, a block polymer results, with certain sections so rich in urethane and aromatic concentration that maximum hydrogen bonding and even local crystallization can occur. This provides improved physical properties at moderate temperatures.

Molecular Weight Is of Major Import

The nature of the polymer will be governed by five factors: molecular weight, degree of crosslinking, degree of crystallinity, amount of hydrogen bonding, and rigidity of chain units.

Molecular weight of a urethane polymer theoretically achieves a maximum when stoichiometric amounts of reactants are used; that is, when the NCO/H value is 1.0. At values below 1.0, hydroxyl or amine-terminated polymers are formed which are lower in molecular weight. At values greater than 1.0, isocyanate-terminated molecules are formed. Since these are capable of further reaction with urethane or urea groups, the final molecular weight is not necessarily lower and the degree of crosslinking is increased, as shown in Table II.

TABLE I—COMPARISON OF HARD AND SOFT CAST URETHANE

Shore A Hardness	1-60	50-100
Tensile (psi)	<2700	3000-8000
Elongation (%)	50-1100+	450-800
100% Modulus (psi)	10-200	250-1600
Isocyanate content (wt. %)	5-30	15-38

The presence of low molecular weight fractions in samples 1 and 2 is indicated by the low durometer values and higher extractable contents. Increased crosslinking in II—4 to 6 is apparent from the increased Shore A-2 values and decreased swell in acetone. It can be seen that polymer properties are more sensitive to variations in NCO/OH value below 1.0 than above. For this reason, many formulators operate at values of 1.05 to 1.10 to insure against falling into the sensitive regions.

The degree of crosslinking, often indicated as molecular weight per branch point (M_c), may be controlled in various ways. The most common method is to incorporate triols or tetrols in the formulation *(3, 5 and 6)*, but occasionally triisocyanates are used. Table III presents data obtained on a TDI/Pluronic L-44 system in which crosslinking was controlled by various means.

Gauging Increased Crosslinking

In samples 2 to 4 the only variation was the increased NCO/OH ratio. For samples 5 to 7, the NCO/OH value remained at 1.0, while increasing amounts of TMP (trimethyol propane) were dissolved in the L-44 prior to reaction with TDI. In sample 11 the TMP was pre-reacted with the TDI, after which L-44 was added. Part of the TDI of samples 8 to 10 was replaced with sufficient aromatic triisocyanate to provide the desired M_c. The use of triisocynate provides about the same effects as the use of TMP at comparable M_c values.

Note also that, although increasing the NCO/OH values provides most of the symptoms of increased crosslinking, such is not the case with polymer melting points. This may be attributed to the instability of biuret or allophanate branch points (arising from excess isocyanate) at elevated temperatures. Thus, where high temperature properties are desired, crosslinking should be provided by the use of trifunctional components, rather than by increased NCO/OH values.

TABLE II—EFFECT OF NCO/OH VALUE ON TDI/MULTRON® R-18 POLYMERS*

Sample	NCO/OH	Shore A-2	Tensile, (psi)	Elong. (%)	100% Mod. psi	T_g (° C.)	Acetone Sol. (Wt. %)	Acetone Swell (Vol. %)
No. 1	0.60	1	75	1200	7	—32	18	700
No. 2	0.80	26	150	300	25	—29	6	310
No. 3	1.00	54	240	85	—	—26	4	170
No. 4	1.20	62	250	80	—	—20	4	140
No. 5	1.40	66	235	60	—	—20	3	130
No. 6	1.60	63	260	90	—	—18	3	120

* For formulation and cure, refer to Table VII, samples 18 to 23.

TABLE III—EFFECT OF M_c ON TDI/PLURONIC L-44 POLYMERS (Direct, One Step Method)

Sample	Crosslinking Source	M_c	Gel Time (min.)	Shore A-2	Tensile (psi)	Elong. (%)	100% Mod. (psi)	Acetone Swell (Vol. %)	M.P. (° C.)
No. 1	None, control	∞	—	1	—	—	—	—	165
No. 2	Increased NCO/OH 1.2	—	40	33	190	610	47	480	173
No. 3	Increased NCO/OH 1.4	—	30	44	190	220	110	310	180
No. 4	Increased NCO/OH 1.6	—	40	54	225	120	190	170	180
No. 5	TMP	17,500	20	22	170	730	30	580	175
No. 6	TMP	8,800	15	40	170	250	80	350	200
No. 7	TMP	6,100	12	40	140	190	80	325	220
No. 8	Triisocyanate	17,500	20	20	160	710	26	580	220
No. 9	Triisocyanate	8,800	12	35	150	270	64	350	230
No. 10	Triisocyanate	6,100	7	38	135	190	80	310	237
No. 11	TDI/TMP adduct	6,100	25	41	170	210	88	310	225

TABLE IV—EFFECT OF CATALYST ON TDI/MULTRON R-68 POLYMERS (Direct, One Step Method*)

Sample	Catalyst	Gel Time (min.)	Shore A-2	Tensile (psi)	Elong. (%)	800% Mod. (psi)	T_g (° C.)	Acct. Swell (Vol. %)
No. 1	SPCP** 0.10%	15	43	1000	800	1000	—28	310
No. 2	SPCP** .01%	25	45	1020	800	1020	——	310
No. 3	SPCP** .001%	50	31	1520	1000	450	——	330
No. 4	None —	80	27	1260	1000	325	—28	350
No. 5	MgO† 0.10%	22	23	500	1000	100	——	700
No. 6	MgO† 0.30%	15	19	300	1300	75	—28	700

* Cured 75 min. at 115° C. plus 3 hrs. at 100° C. NCO/OH = 1.0. ** Sodium pentachlorophenate.
† Dissolved in the polyester, probably as Mg adipate.

TABLE V—EFFECT OF UREA GROUPS ON TDI/PLURONIC L-44 POLYMERS*

Sample	H_2O per 100 L-44	NCO/H**	Urea Conc. (Wt. %)	Shore A-2	Tensile (psi)	Elong. (%)	100% Mod. (psi)	Acet. Swell (Vol. %)
No. 1	None	1.0	<0.2	liquid	—	—	—	—
No. 2	0.17	1.0	0.50	34	600	1100	25	1050
No. 3	0.35	1.0	1.01	39	220	410	75	390
No. 4	0.52	1.0	1.51	56	220	190	140	240
No. 5	None	1.4	<0.2	44	190	220	110	170
No. 6	0.17	1.4	0.49	56	210	110	190	200
No. 7	0.35	1.4	0.97	52	245	130	205	170

* For formulation and cure refer to Table X-13 to 20. ** H including active hydrogen in H_2O and L-44.

TABLE VI—STABILITY OF CAST URETHANES AT 100° C.

Sample	Hydroxyl Components*	Water Content (per 100 of L-61)	NCO/H	M_c**	Shore A Hardness Retention: Initial	After 64 hrs. at 100° C.	(%)
No. 1	Multrathane R-26	0	0.75	——	23	23	100
No. 2	Multrathane R-26	0	0.96	5,100	48	48	100
No. 3	Pluronic L-61, H_2O	0.11	1.00	∞	1	1	—
No. 4	Pluronic L-61, H_2O	0.25	1.00	∞	1	1	—
No. 5	Pluronic L-61, H_2O	0.39	1.00	∞	8	5	62
No. 6	Pluronic L-61, H_2O	0.66	1.00	∞	22	20	91
No. 7	Pluronic L-61, H_2O	0.11	1.20	∞	25	2	15
No. 8	Pluronic L-61, H_2O	0.28	1.19	∞	27	15	60
No. 9	Pluronic L-61, H_2O	0.45	1.17	∞	36	23	85
No. 10	Pluronic L-61, TMP, H_2O	0.32	1.20	∞	20	1	5
No. 11	Pluronic L-61, TMP, H_2O	0.28	1.20	12,500	29	15	52
No. 12	Pluronic L-61, TMP, H_2O	0.56	1.40	∞	40	20	50
No. 13	Pluronic L-61, TMP, H_2O	0.48	1.40	12,500	42	42	100

* All polymers prepared with TD-80. ** Not corrected for branching due to allophanate or urea formation.

TABLE VII—TDI/POLYESTER POLYMERS

Direct, One Step Method

ESTER	FORMULATION (pbw)				COMPOSITION (Wt., %)					PROPERTIES					
Sample	Ester	Mondur TD-80	NCO/OH	Cure	TDI	Aromatic	Urethane	Urea	Wt., / Branch Point	Shore A-2	Tensile (psi)	Elong. (%)	100% Mod. (psi)	T_g (°C.)	Acetone Sol. (%)	Acetone Swell (Vol. %)
No. 1 Multrathane R-26	100	6.50	0.70		6.10	2.6	4.1	<0.2	——	7-13	——	——	——	——	——	——
No. 2 Multrathane R-26	100	7.00	0.75		6.54	2.8	4.3	0.2	——	17-22	200	665	30	——	——	——
No. 3 Multrathane R-26	100	7.50	0.80	*	6.98	3.0	4.6	0.2	ca 5,100	27-32	——	——	——	——	——	——
No. 4 Multrathane R-26	100	8.00	0.86		7.41	3.2	5.0	0.2	——	35-40	——	——	——	——	——	——
No. 5 Multrathane R-26	100	9.00	0.96		8.25	3.5	5.5	0.2	——	40-45	210	190	135	——	——	——
No. 6 Multron R-16	100	4.72	0.60		4.48	1.9	2.6	<0.2	——	Liquid	——	——	——	——	——	——
No. 7 Multron R-16	100	6.27	0.80		5.88	2.5	3.4	0.2	——	Liquid	——	——	——	——	——	——
No. 8 Multron R-16	100	7.84	1.00	**	7.28	3.1	4.3	0.2	∞	53	880	970	150	—29	3	310
No. 9 Multron R-16	100	9.40	1.20		8.60	3.7	4.3	0.2	——	62	440	250	260	—26	3	170
No. 10 Multron R-16	100	10.95	1.40		9.90	4.3	4.2	0.2	——	65	320	150	240	—27	2	150
No. 11 Multron R-16	100	12.60	1.60		11.20	4.9	4.1	0.2	——	64	290	100	290	—26	3	130
No. 12 Multron R-68	100	5.07	0.60		4.79	2.1	2.8	<0.2	——	Liquid	——	——	——	——	——	——
No. 13 Multron R-68	100	6.75	0.80		6.32	2.7	3.8	0.2	——	1	260	>1300	10	—31	14	700
No. 14 Multron R-68	100	8.43	1.00	†	7.77	3.3	4.7	0.2	ca 17,000	52	490	400	205	—28	3	190
No. 15 Multron R-68	100	10.13	1.20		9.21	4.0	4.7	0.2	——	60	310	100	310	—26	3	150
No. 16 Multron R-68	100	11.80	1.40		10.55	4.5	4.6	0.2	——	64	305	90	——	—25	3	150
No. 17 Multron R-68	100	13.51	1.60		11.90	5.1	4.5	0.2	——	64	295	80	——	—24	3	140
No. 18 Multron R-18	100	5.90	0.60		5.58	2.0	3.4	<0.2	——	1	75	1200	7	—32	18	700
No. 19 Multron R-18	100	7.86	0.80		7.30	3.1	4.5	0.2	——	26	150	300	75	—29	6	310
No. 20 Multron R-18	100	9.83	1.00		8.93	3.8	5.7	0.2	ca 5,100	54	240	85	——	—26	4	170
No. 21 Multron R-18	100	11.80	1.20	††	10.57	4.5	5.6	0.2	——	62	250	80	——	—20	4	140
No. 22 Multron R-18	100	13.75	1.40		12.09	5.2	5.5	0.2	——	66	235	60	——	—20	3	130
No. 23 Multron R-18	100	15.72	1.60		13.60	5.8	5.4	0.2	——	63	260	90	——	—18	3	120
No. 24 Multron F-30	100	5.73	0.60		5.42	2.3	3.1	<0.2	——	1	30	>1000	3	—20	27	95
No. 25 Multron F-30	100	7.65	0.80		7.10	3.0	4.2	0.2	——	19	80	340	22	——	14	120
No. 26 Multron F-30	100	9.43	1.00		8.62	3.7	5.2	0.2	ca 4,200	34	150	240	65	—10	4	95
No. 27 Multron F-30	100	11.47	1.20	§	10.30	4.4	5.1	0.2	——	35	190	230	77	——	5	80
No. 28 Multron F-30	100	13.40	1.40		11.80	5.1	5.1	0.2	——	32	260	270	85	—12	5	70
No. 29 Multron F-30	100	15.33	1.60		13.12	5.7	5.0	0.2	——	34	270	250	90	—10	5	70

* 2 hrs. at 130° C., no catalyst.
** 40 min. at 115° C. plus 2 hrs. at 100° C., .01% Dowicide G catalyst.
† 40 min. at 115° C. plus 2 hrs. at 110° C., .007% Dowicide G catalyst.
‡ 40 min. at 115° C. plus 2 hrs. at 110° C., no catalyst.
§ 40 min. at 115° C. plus 2 hrs. at 110° C., no catalyst.

TABLE VIII—TDI/CASTOR OIL POLYMERS

Direct, One Step Method*

Sample	Formulation (pbw)*				Composition (Wt., %)					Properties			
	Castor Oil	Flexricin 9	Mondur TD-80	NCO/OH	TDI	Aromatic	Urethane	Urea	Wt./ Branch Point	Shore A-2	Tensile psi	Elong. %	100% Mod. psi
No. 1	67	33	34.5	1.0	25.7	11.0	16.4	<0.2	1980	47	940	270	180
No. 2	57	43	35.4	1.0	26.2	11.3	17.2	<0.2	2290	43	1280	300	180
No. 3	57	43	38.9	1.1	28.0	12.0	16.8	<0.2	——	55	2460	260	300
No. 4	57	43	42.3	1.2	29.7	12.9	16.5	<0.2	——	63	2170	220	540
No. 5	49	51	38.6	1.0	27.9	12.0	18.4	<0.2	2710	43	1370	330	170

* Cured 40 min. at 140° C. plus 2 hrs. at 100° C. 0.5% C-16 catalyst.

Allophanate and biuret branching may also occur at NCO/OH values of 1.0 under certain conditions of elevated temperature or alkalinity, *(4)*. Therefore, a given formulation can be made to provide a series of elastomers by varying the catalyst or cure conditions. Table IV demonstrates typical effects obtained using a basic catalyst to promote side reactions or a metal catalyst not causing side reactions.

The alkaline SPCP provides more crosslinked polymers, whereas the MgO causes the formation of softer, more extensible products, in spite of the fact that the rate of reaction—as indicated by decreasing gel time and increased rate of –NCO disappearance—has increased. This may be interpreted as selective catalyzation of the NCO/OH reaction by the MgO, to the exclusion of side reactions. Similar effects have recently been reported with compounds of other metals, such as titanium and tin *(2)*.

More Crystallization in Harder Products

A high degree of crystallization is encountered most often in the harder products based on poly(ethylene adipate) or poly(1,4-oxybutylene). Urethanes prepared with other, less regular polyesters, castor oil, or poly (1-2-oxypropylene) do not crystallize significantly. As mentioned above, certain types of block polymers possess superior physical properties which may be attributed to local areas of crystallinity, but this relationship has not yet been proven.

In polyether glycol systems, the degree to which hydrogen bonding occurs is proportional to the concentration of polar urethane and the even more effective urea groups. Increased hydrogen bonding is evidenced by increased hardness, toughness and a higher glass transition point (T_g). In the polyester systems, polar ester groups provide moderate hydrogen bonding, accounting for the improved room temperature properties and higher glass transition points of the polyester urethanes.

The effect of urethane group concentration is clearly defined by Smith and Magnusson *(6)*, from whose data Table XI was derived. The effect of urea groups, created by adding small amounts of water to the reactants, is given in Table V.

Aromatic content, a rigid chain unit, is in most cases provided by the use of aryl isocyanates. Therefore, increasing aromaticity is also accompanied by increasing urea or urethane concentrations. In isolated

TABLE IX—TDI/CASTOR OIL POLYMERS

Prepolymer Method*

Sample	Formulation (pbw)*			Composition (Wt., %)					Properties			
	Prepolymer	Chain Extender	NCO/OH	TDI	Aromatic	Urethane	Urea	Wt./ Branch Point	Shore A-2	Tensile psi	Elong. %	100% Mod. psi
No. 1	Castor Oil/ Mondur TD-80	Flex. 15	1.0	25.2	10.7	17.1	<0.2	2490	57	1210	240	240
No. 2	Castor Oil/ Mondur TD-80	9	1.0	26.0	11.2	17.6	<0.2	2410	54	1750	270	240
No. 3	Castor Oil/ Mondur TD-80	32	1.0	16.2	7.0	11.0	<0.2	3870	25	120	160	65
No. 4	Castor Oil/ Mondur TD-80	Niax Diol 2025	1.0	11.0	4.7	7.5	<0.2	4050	14	85	310	30
No. 5	Castor Oil/ Mondur TD-80	Niax Diol 425	1.0	25.2	10.7	17.1	<0.2	2490	51	830	280	190

* Cured 40 min. at 140° C. plus 2 hrs. at 100° C. 0.5% C-16 catalyst.

TABLE X—TDI/POLYETHER GLYCOL POLYMERS

Direct, One Step Method

	FORMULATION (pbw)					COMPOSITION (wt. %)					PROPERTIES						
Sample	Diol	H_2O	TMP	Mondur TD-80	NCO/OH	TDI	Aromatic	Urethane	Urea	Wt./ Branch Point	Shore A-2	Tensile (psi)	Elong. (%)	100% Mod. (psi)	T_g (°C.)	Acetone Sol. (%)	Acetone Swell (Vol. %)
No. 1* Pluronic L-31, H_2O	100	0.59	—	22.8	1.0	18.6	8.0	9.0	1.54	∞	7	250	>1100	20	—	—	—
No. 2* Pluronic L-31, H_2O	100	0.59	—	27.4	1.2	21.5	9.2	8.7	1.49		43	260	270	110	—	—	—
No. 3* Pluronic L-31, H_2O	100	0.59	—	32.0	1.4	24.3	10.5	8.4	1.44		53	380	200	190	—	—	—
No. 4* Pluronic L-61, H_2O	100	0.32	—	11.85	1.0	10.6	4.6	5.2	0.93	∞	Liq.	—	—	—	—	—	—
No. 5* Pluronic L-61, H_2O	100	0.32	—	14.23	1.2	12.5	5.4	5.0	0.87		5	175	>1100	19	—	—	—
No. 6* Pluronic L-61, H_2O	100	0.32	—	16.60	1.4	14.2	6.1	5.0	0.85		17	200	790	37	—	—	—
No. 7* Pluronic L-61	100	0.15	—	14.25	1.4	12.5	5.4	4.9	0.41		7	310	>1100	18	—	—	—
No. 8* Niax Diol 2025	100	0.16	—	13.70	1.4	12.1	5.2	4.9	0.44		6	65	720	14	—	—	—
No. 9* P 2000	100	0.17	—	14.93	1.4	13.0	5.3	4.9	0.47		4	80	680	10	—	—	—
No. 10* Pluronic L-81, H_2O	100	0.22	—	8.95	1.0	8.22	3.5	4.0	0.67	∞	Liq.	—	—	—	—	—	—
No. 11* Pluronic L-81, H_2O	100	0.22	—	10.75	1.2	9.73	4.2	3.9	0.66		1	12	190	11	—4	—	—
No. 12* Pluronic L-81, H_2O	100	0.22	—	12.50	1.4	11.1	4.7	3.9	0.65		1	65	>1100	11	—	—	—
No. 13* Pluronic L-44	100	0	—	8.30	1.0	7.67	3.3	4.9	<0.2	∞	Liq.	—	—	—	—	100	—
No. 14* Pluronic L-44	100	0	—	9.87	1.2	9.09	4.0	4.8	<0.2		33	190	610	47	—47	7	310
No. 15** Pluronic L-44	100	0	—	11.60	1.4	10.4	4.6	4.7	<0.2		44	190	220	110	—47	1	170
No. 16** Pluronic L-44, H_2O	100	0.17	—	9.97	1.0	9.09	3.9	4.8	0.50	∞	34	600	>1100	25	—49	4	1050
No. 17** Pluronic L-44, H_2O	100	0.35	—	11.60	1.0	10.4	4.6	4.7	1.01		39	220	410	75	—48	3	390
No. 18** Pluronic L-44, H_2O	100	0.52	—	13.25	1.0	11.7	5.0	4.6	1.51		56	220	190	140	—47	1	240
No. 19** Pluronic L-44, H_2O	100	0.17	—	13.92	1.4	12.2	5.3	4.5	0.49		56	210	110	190	—49	1	200
No. 20** Pluronic L-44, H_2O	100	0.35	—	16.25	1.4	14.0	6.0	4.5	0.97		52	245	130	205	—44	1	170
No. 21** Pluronic L-44, TMP	100	0	0.85	9.97	1.0	9.09	3.9	6.1	<0.2	17,500	22	170	730	30	—50	6	590
No. 22** Pluronic L-44, TMP	100	0	1.71	11.60	1.0	10.4	4.5	7.0	<0.2	8,900	40	170	250	80	—45	3	350
No. 23** Pluronic L-44, TMP	100	0	2.57	13.25	1.0	11.7	5.0	7.9	<0.2	6,070	40	140	190	80	—44	4	330

* Cured 40 min. at 140° C. plus 2 hrs. at 100° C., 0.5% C-16 catalyst.

** Cured 40 min. at 115° C. plus 2 hrs. at 100° C., 0.5% Dowicide G catalyst.

instances, aromaticity may be introduced by the use of aryl amines or hydroxl compounds, but these are not yet available in variety on a commercial scale. Aromaticity provides increased hardness and modulus, but, unlike hydrogen bonding, does not usually improve toughness or tensile strength.

It has been observed that urethanes prepared from polyethers, while possessing excellent hydrolysis resistance, seem to be more sensitive to oxidation at elevated temperatures than those based on polyesters. This deterioration is evidenced by a decrease in tensile and hardness, and a marked increase in the acetone soluble fraction. Table VI contains typical data.

Test Procedures and Results

The aging of the samples in the form of thin sheets, was done in a circulating air oven at 100° C. Specimens 1 and 2 demonstrate the superior stability of the polyester products. These two polymers were heated for as much as one week at 100° C. without noticeable decrease in hardness. With the polyether urethanes, the presence of urea groups or crosslinking reduces the rate of softening. Samples 3 to 9 demonstrate the effect of increasing urea content, while 10 to 13 illustrate the beneficial effect of crosslinking achieved by the use of TMP.

Evident deterioration has been demonstrated to be oxidative in nature, and has been tentatively attributed to scission of the polyether portions of the polymer. In addition to the above factors, which at least decrease the *effect* of oxidation (i.e., softening) even if they may not influence the actual *rate* of oxidation, the use of conventional antioxidants has been shown to be of value. Hence, in systems employing only diisocyanate and polyethers, the use of an antioxidant is recommended. The data in Tables VII to XII were obtained on polymers prepared from components identified in Table XIII. These tables also indicate cure conditions and identify catalysts when they were used.

In the column marked "Composition" will be found the isocyanate content—of interest in cost calculations—and the concentrations of aromatic (C_6H_3), urethane (–NHCOO–), and urea (–NHCONH–) groups on a weight per cent basis. The value of M_c was calculated by considering only the crosslinking deliberately introduced with trifunctional components. Additional crosslinking obviously occurred via side reactions in some cases, but its effect on M_c was not assessed.

Physical properties including tensile were determined by conventional ASTM methods. The glass transition temperature (T_g) was approximated by the Clash-Berg procedure. Acetone solubles were deter-

TABLE XI—MISCELLANEOUS CAST URETHANES*

Direct, One Step Method**

	Formulation		Composition (wt. %)				Properties				
Sample	Blend of Niax Diol 2025, diethylene glycol and TMP	NCO/OH	Aromatic	Urethane	Urea	Wt./ Branch Point	Tensile (psi)	Elong. (%)	T_g (° C.)	Benzene Sol., (%)	Benzene Swell (Vol. %)
No. 1	1, 6-Hexane Di-isocyanate	1.10	0	8.4	nil	8,500	80	150	—65	4.6	619
No. 2	1, 6-Hexane Di-isocyanate	1.10	0	10.9	nil	8,500	120	150	—62	2.4	452
No. 3	1, 6-Hexane Di-isocyanate	1.10	0	13.6	nil	8,500	135	160	—59	2.4	384
No. 4	1, 6-Hexane Di-isocyanate	1.10	0	17.0	nil	8,500	225	280	—55	2.6	315
No. 5	1, 6-Hexane Di-isocyanate	1.10	0	13.6	nil	2,500	200	110	—59	2.0	294
No. 6	1, 6-Hexane Di-isocyanate	1.10	0	13.6	nil	4,500	220	190	——	1.9	342
No. 7	1, 6-Hexane Di-isocyanate	1.10	0	13.6	nil	8,500	130	160	——	2.4	384
No. 8	1, 6-Hexane Di-isocyanate	1.10	0	13.6	nil	12,500	160	310	——	3.3	467
No. 9	2, 4 TDI	1.10	9.5	13.6	nil	2,500	280	110	—34	0.7	216
No. 10	2, 4 TDI	1.10	9.5	13.6	nil	4,500	250	200	——	0.5	275
No. 11	2, 4 TDI	1.10	9.5	13.6	nil	8,500	230	330	——	1.1	368
No. 12	2, 4 TDI	1.10	9.5	13.6	nil	20,000	320	710	——	1.8	629

* From Reference 5.
** Cured 72 hrs. at 60° C. Ferric Acetylacetonate catalyst.

TABLE XII—TDI/POLYETHER GLYCOL POLYMERS

Prepolymer Method

Sample	Formulation (pbw) Pre-polymer	Chain Extender	NCO/H	Composition (Wt., %) TDI	Aromatic	Urethane	Urea	Wt./Branch Point	Properties Shore A-2	Tensile (psi)	Elong. (%)	Acetone Swell (Vol. %)
No. 1	Niax Diol 425	Niax Diol 425	0.8††	27.4	11.8	16.4	1.00		Liq.	—	—	—
No. 2	Niax Diol 425	Niax Diol 425	1.0††	30.0	12.9	18.2	0.97	∞	30	250	900	—
No. 3	Niax Diol 425	Niax Diol 425	1.2††	31.9	13.7	17.3	0.94		53	1000	650	—
No. 4	Niax Diol 1025	Niax Diol 150	0.8††	25.3	10.9	14.2	0.75		Liq.	—	—	—
No. 5	Niax Diol 1025	Niax Diol 150	1.0††	26.0	11.2	15.8	0.75	∞	10	150	750	—
No. 6	Niax Diol 1025	Niax Diol 150	1.2††	26.5	11.4	14.6	6.75		32	330	625	—
No. 7	Niax Diol 1025	Niax Diol 1025	0.8††	15.58	6.7	8.8	0.71		Liq.	—	—	—
No. 8	Niax Diol 1025	Niax Diol 1025	1.0††	16.97	7.3	9.8	0.61	∞	1	80	1800	—
No. 9	Niax Diol 1025	Niax Diol 1025	1.2††	18.35	7.9	9.5	0.55		15	100	500	—
No. 10	Niax Diol 2025	Niax Diol 150	0.8††	14.63	6.3	8.5	<0.2		Liq.	—	—	—
No. 11	Niax Diol 2025	Niax Diol 150	1.0††	14.87	6.4	9.5	<0.2	∞	Liq.	—	—	—
No. 12	Niax Diol 2025	Niax Diol 150	1.2††	15.10	6.5	8.6	<0.2		15	<20	>3000	—
No. 13	Niax Diol 2025	DCB†	0.9	14.00	12.6	6.4	3.8		55	230	170	75
No. 14	Niax Diol 2025	DCB†	1.0	14.15	12.1	6.4	3.8	∞	61	290	270	120
No. 15	Niax Diol 2025	DCB†	1.1	14.32	11.6	6.5	3.5		61	380	620	310
No. 16	Niax Diol 2025*	DCB†	0.9	14.50	11.0	4.9	3.4		42	270	220	270
No. 17	Niax Diol 2025	DCB†	1.0	14.60	10.6	5.0	3.4		49	650	350	270
No. 18	Niax Diol 2025		1.1	14.75	10.4	5.0	3.1		52	650	360	270
No. 19	Niax Diol 2025**	DCB†	0.9	10.70	7.8	5.0	2.2		6	35	160	Dissolved
No. 20	Niax Diol 2025**	DCB†	1.0	10.75	7.5	5.0	2.2	∞	15	53	180	Dissolved
No. 21	Niax Diol 2025**	DCB†	1.1	10.80	7.3	5.0	2.0		10	45	180	Dissolved

* Heated so as to provide allophanate crosslinking. ** Prepared at initial NCO/OH of 1.4 instead of 2.0 † dichlorobenzidine.
†† Cured 40 min. at 140° C. plus 2 hrs. at 100° C. with 0.5% C-16 catalyst; all others 30 min. at 140° C. plus 90 min. at 100° C. without catalyst.

mined by extracting a shredded sample in a Soxhlet-type apparatus for four hours. The swell in acetone was observed by immersing a strip of polymer in acetone for four hours at room temperature, measuring the lineal increase, and converting this value to per cent volume increase.

Table VII summarizes typical polyester formulations prepared by the direct, one-step method. Polymers 24 to 29, prepared with Multron F-30, contain fewer ester groups than the adipate types used in samples 1 to 23. This accounts for their lower hardness and modulus values. Polymers obtained from castor oil or its derivatives are found in Tables VIII and IX. Many more examples, based on proprietary components, have been studied elsewhere *(7)*.

Table X summarizes products prepared with polyether glycols by the direct, one-step technique. Most of these involve the use of water to provide tougher

TABLE XIII—IDENTIFICATION OF RAW MATERIALS

Material	Description	Source
Dow P-2000	Polypropylene glycol MW 2000	Dow Chemical Co.
Dowicide G	Sodium Pentachlorophenate	Dow Chemical Co.
Catalyst C-16	Tertiary amine	Mobay Chemical Co.
Flexricin 9	Propylene glycol monoricinoleate	Baker Castor Oil Co.
Flexricin 15	Ethylene glycol monoricinoleate	Baker Castor Oil Co.
Flexricin 32	Mono dehydrated castor oil	Baker Castor Oil Co.
Mondur TD-80	Tolylene diisocyanate, 80% 2,4; 20% 2,6 isomers	Mobay Chemical Co.
Multrathane R-26	Branched polyadipate, OH No. 57-63	Mobay Chemical Co.
Multron R-16	Linear polyadipate, OH No. 36-40	Mobay Chemical Co.
Multron R-68	Slightly branched adipate, OH No. 45-52	Mobay Chemical Co.
Multron R-18	Branched polyadipate, OH No. 57-63	Mobay Chemical Co.
Multron F-30	Experimental polyester, based on "dimer acid," OH No. 54-60	Mobay Chemical Co.
Niax Diol 150	Polypropylene glycol, MW 150	Union Carbide Chem. Co.
Niax Diol 425	Polypropylene glycol, MW 425	Union Carbide Chem. Co.
Niax Diol 1025	Polypropylene glycol, MW 1025	Union Carbide Chem. Co.
Niax Diol 2025	Polypropylene glycol, MW 2025	Union Carbide Chem. Co.
Pluronic L-31	Mixed ethylene/propylene oxide condensates terminated with primary OH groups, MW 1000	Wyandotte Chem. Corp.
Pluronic L-61	terminated with primary OH groups, MW 2000	Wyandotte Chem. Corp.
Pluronic L-81	terminated with primary OH groups, MW 2300	Wyandotte Chem. Corp.
Pluronic L-44	Same, but higher ratio of EO/PO, MW 2200	Wyandotte Chem. Corp.

polymers. Table XI demonstrates the effect of M_c, aromaticity and urethane concentration in polyether glycol-based polymers. Additional data are available *(6)*.

Practical Applications Are Limited

Polyether elastomers prepared via the prepolymer route are presented in Table XII. The NCO/H values refer to the second (cure) step; prepolymers were prepared at NCO/OH values of 2.0, except for samples 19 to 21. The fact that polymers 13 to 21 are so much harder and tougher than 10 to 12, while polymers 9 to 12 are only slightly different from 5 to 9, indicates that the urea groups resulting from the use of aromatic diamine have more effect than the simultaneous increase in aromaticity. A brief summary of those polymers presenting the best combinations of tensile and elongation in various hardness ranges is found in Table XIV.

The foregoing has attempted to demonstrate the wide variety of low durometer, cast urethanes which may be prepared with TDI. Many of the examples are of experimental interest only, since the commercial production of flawless castings is an art in itself. Considerable work is required to determine the optimum type of catalyst or conditions of cure for any given formulation.

Processes involving amine cure, for example, are troublesome because of the rapidity of the reaction. The preparation of polymers involving water—to provide urea groups—requires exact control to avoid gas evolution after the casting has been poured. Polymers that do not employ amines or water are very simple to prepare, but unfortunately do not provide the ultimate in properties.

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TABLE XIV—SOME TYPICAL CAST URETHANE POLYMERS

Components	TDI, (Wt. %)	Shore A-2	Tensile (psi)	Elong. (%)	Table Reference
TD-80, Multron R-16	7.28	53	880	970	VII-8
TD-80, Flexricin 9, castor oil	28.0	55	2460	260	VIII-3
TD-80, Niax Diol 425	31.9	53	1000	650	XII-3
TD-80, Pluronic L-44, H_2O	11.7	56	220	190	X-18
TD-80, Pluronic L-44, H_2O	9.09	34	600	1100	X-16
TD-80, Pluronic L-44, TMP	9.09	22	170	730	X-21
TD-80, Multrathane R-26	6.54	20	200	665	VII-2
TD-80, Pluronic L-61	12.5	7	310	1100	X-7

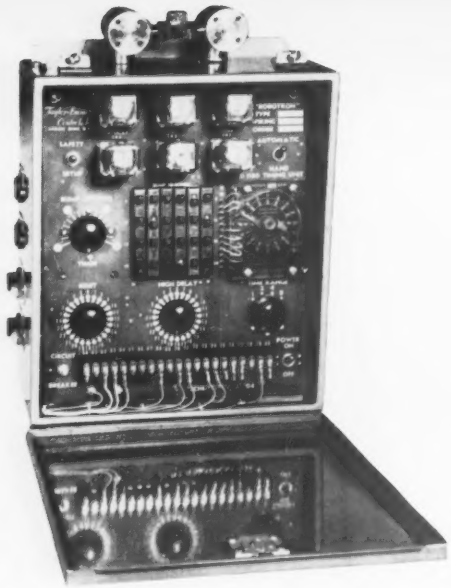


FIG. 1—A novel timing unit, the E574 Robotron, is helping to bring automation to presses for molded rubber parts.

By James J. OCKULY *Wyatt Sales Corp., Cleveland, Ohio*

Automatic Controls

can run your rubber and plastics presses

A NEW STEP forward in automatic controls is solving problems in the production of plastic and rubber-molded products. In plastics and rubber molding, it is necessary to release pressure on the mold to let steam and gas escape, then to reapply pressure. This step is called "bumping" and may be required several times in the cycle. Quality is improved, scrap is reduced, and setup time is drastically shortened through the use of controllers that provide positive control over bumping.

One model, made by Taylor-Emmett Controls, Inc., Akron, Ohio—the E574S Robotron Time Cycle Controller — controls the spacing and number of bumps of a hydraulic press used in making rubber parts, the amount of press opening during each bump, the length of time delay before high pressure is admitted to the ram, and the total cycle time. With this control, all parts can be made without air pockets forming and without scorching the surface. These used to be dangers when bumping did not occur at proper time intervals and for constant lengths of time. Workers on piece work are now not tempted to omit bumping or cut short the cycle, because running time is controlled automatically.

The controller case can be locked so that no one can tamper with the adjustments once the cycles are set up. High-capacity solenoid valves that control the air supplied to the press are mounted to the Robotron case at their electrical connections. The wiring is protected and the air connections are entirely outside of the case.

Two 33852-R valves, made by Airmatic Valve Inc., Cleveland, Ohio, are used with the E574S Robotron Timer. The 33852-R is a normally closed three-way valve, with a maximum operating pressure of 90 psi. It was selected because of its high capacity, ease of mounting and dependability. The valve has also been found to eliminate the need for booster valves where there are multiple connections.

The valve is normally closed. When energized by the unit's timer, a magnetic field pulls the valve plunger down to contact with the stop. This movement, transferred through the valve spool, opens the inlet port. Inlet, cylinder and exhaust ports are all located in the base.

Since the valve is connected to the timer at its electrical connection, all of the ports are easily accessible—an advantage if service is required since it is not necessary to move rigid piping for disassembly. The valve is particularly suited for uses where reliability is most important. It has a life of over 20 million cycles under normal operating conditions, based on laboratory tests.

With the Robotron Timer, a press operating cycle can be set up in 15 minutes. All that is needed is to adjust four dials and a switch for each bump required in the cycle. The controller is set for the exact number of bumps needed in the cycle, each bump for the desired time in the cycle, the amount of press opening at each bump controlled precisely, and the time for allowing high pressure to the press likewise set on a dial. With this control, a manufacturer can use a minimum number of bumps and reduce strain and wear throughout the press, its packing and valves. He can even reduce the shock reflected back to the pumping unit.

The timer is used to control a press cycle. The setting of the time-range switch at the lower right of the control (shown in Figure 1) depends on the length of cycle needed by the press. With the switch in the No. 1 position, total cycle lengths can be set to the nearest ⅛ minute in the 3 to 6 minute range. When the switch is in the No. 2 position, total cycle lengths range from 3 to 9 minutes in multiples of ¼ minute. With the switch on No. 4, the total cycle lengths range from 3 to 15 minutes set at ½-minute intervals. With the switch on No. 8, cycles can be varied from 3 to 27 minutes, set at 1 minute intervals.

In the center of the panel is a bump selection keyboard with each pushbutton representing one interval of time—thus enabling a bump to be set at any or all of the 24 time intervals following the starting pushbutton impulse. Because of the manner in which rubber reacts, all of the bumping is generally done in the first 3 minutes of the cycle. Therefore, times for the start of each bump are set ⅛ minute apart.

The bump opening timer is at the left of the selection keyboard. Its setting determines the length of time the press stays open. The dial has a general range of 4 to 15 seconds, depending on the application. The setting of this dial causes the solenoid valve to release air from the press valve, causing the press to open for the desired time, then to close.

The high delay switch at the bottom of the bump selector panel operates the second valve which blocks the admission of high pressure hydraulic fluid until the selected time. For example, if the high pressure were delayed through a switch setting at the No. 12 position, it would come on at the 12th interval (in 1½ minutes). Any bumping required prior to this interval would be done on low pressure only, bumping at the 12th or following intervals being accomplished at high pressure.

Resetting and Operating Automatically

In the lower left corner of the control is the reset selector switch selecting the interval after the initial 3-minute period at which the cycle is to end. The time value of these intervals is determined by setting the time range switch. Suppose the time cycle is to be set at 5⅛ minutes: By setting the time range switch on "1," cycles from 3 to 6 minutes long would be obtained. When the switch is on "1," each time interval is ⅛ minute. Setting the reset selector switch to the number of intervals and adding 3 minutes, gives the desired cycle. In this case, by setting the dial on "17," there are 17 steps of ⅛ minute, equal to 2⅛ minutes. This makes a total cycle of 5⅛ minutes.

The plastic-enclosed timing unit, at the right of the bump selector switches, measures out time intervals in proportion to the speed of the motor, as wel as the setting of the time switches. Examples given here are based on a motor with ½ rpm. Other time intervals and cycles are available with motor speeds of ¼ to 4 rpm. The heart of the controller is the stepping switch that advances at measured time intervals, scanning, as it advances through the pushbutton and the selector switches, to determine when it is time for the selected operations to take place. Timing between bumping intervals is precisely accurate; however, the few seconds set on the bump-opening timer are added to total timing, because the timer stops the timing motor for the interval set for press bumping.

Basic operations of the control instrument begins as the starting pushbutton turns on power to the unit and a timing motor originates pulses to a relay, which in turn energizes the valve solenoid. The 24 pushbuttons on the front of the controller panel are connected to this stepping switch to scan the selection

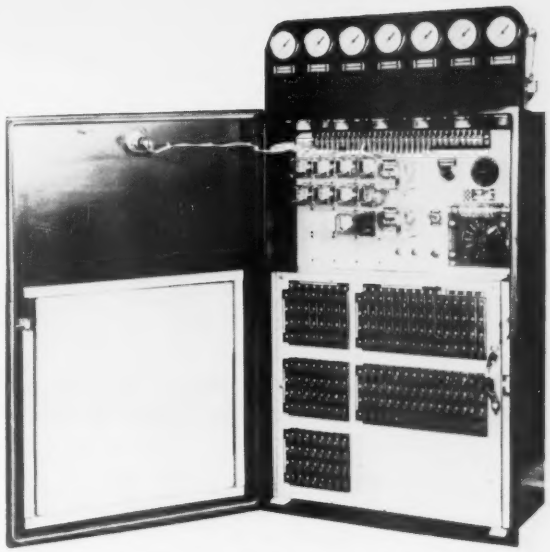


FIG. 2—Tire presses can be run automatically with this control device which actuates all manufacturing steps.

of the number and spacing of the bumps at a timed rate. As each bump takes place, a small timer—adjustable to split seconds—controls the time for the press to open, then the signal is reversed to close the press.

At the same time that the stepping switch is scanning the 24 pushbuttons to determine when a bump is called for, it is also scanning the setting of a selector switch to pick the time when high pressure is to be released and applied to the press. The continuing operation of the stepping switch scans another 24 point selector switch whose purpose is to determine the time when the cycle is ended and the press should open. In order to give maximum life and dependable service, the timing unit is operated at 6 volts A-C, which reduces any tendency toward arcing. A plastic cover over the circuit protects it from dust and foreign matter.

In rubber plant platen presses it is also important to maintain uniformity of temperature across the platen. This is handled by the 284R Condensate Control, improving uniformity of temperature across the platen by periodic purging for mechanical movement of fresh steam through the platen to the outlet connection. This requires a precisely controlled waste of steam to achieve temperature uniformity. If there is no condensate trap on the system, the unit can be set for slightly longer timing to dispose of the condensate. This control also uses a timing motor and provides various speeds for specific applications.

Controls for tire presses must handle several operations in sequence and operation control. The Robotron Tire-Press Control (Figure 2) enables tire manufacturers to get ready quickly for new jobs. Cycles range from 20 minutes to several hours. With this unit, the opening and closing of the press, as well as the state of the bag that forms the inside of the tire, are controlled. The bag may first be filled with water, then with air, steam, and finally with a vacuum.

FIG. 1—Molybdenum disulfide is scooped into a tumbling machine to coat finished rubber parts at the Geneva Rubber Co. plant in Geneva, Ohio.

Compound+MoS_2=

Reduced Friction of Rubber Parts

AN UNUSUAL chemical compound—molybdenum disulfide (MoS_2)—is helping producers of custom rubber parts to build stronger protective properties into products that undergo excessive wear and friction. This specialty material, whose unique lubricity comes from an unusual combination of physical properties, is being utilized both as an additive for rubber compounds and as a coating for finished rubber products to lower surface friction, increase wear resistance and improve anti-seize characteristics.

The Geneva Rubber Company, Geneva, Ohio, applies molybdenum disulfide as a coating on bearing seals used extensively in the automotive trade. These seals must have a low coefficient of friction in order to allow smooth, easy movement of shafts which pass through them, thereby minimizing drag, heat buildup and deterioration. The ability of MoS_2 to form strong, durable films and maintain low coefficients of friction has been particularly useful in this application.

The seals are coated with MoS_2 in a tumbling machine. The manufacturer reports that the compound has excellent covering power, coats parts evenly and is required only in small amounts. Cost of coating the seals is very low, the amount required depending on the size of the part. Furthermore, the somewhat iridescent qualities of MoS_2 make it much easier to spot defects in coated parts than could be done with uncoated rubber. Imperfections stand out more readily when parts are inspected. Unlike graphite, which had been tried before, the new material does not create a serious dust problem. Graphite had a tendency to fly and contaminate the immediate area.

A further benefit for the user is that parts snap into place more readily when they have been coated with MoS_2, thus speeding up assembly. The company reports MoS_2 also shows promise in a seal for screen and storm door closers, greatly reducing friction from the sliding motion each time the door is opened and closed. In this application, the firm plans to add the MoS_2 to the rubber compound directly rather than in the coating for finished parts. Successful results were obtained with mill mixing as well as with the Banbury.

At the Minnesota Rubber Company in Minneapolis, Minn., which specializes in troubleshooting specific rubber problems, molybdenum disulfide additives are utilized as a specialty technique. The material is incorporated in O-rings and quad rings for dynamic sealing applications where movement is involved. In these cases rubber tends to stick to metal parts, a problem obviated by inclusion of MoS_2. The rubber parts are used for such applications as shaft seals, valve checks and piston seals in a variety of fields—aircraft, automobile and farm equipment industries.

Minnesota Rubber reports no production difficulties in compounding MoS_2 into either natural or synthetic rubber. However, close tolerance of amounts is required, since an excess would reduce tensile and elongation. The additive is mixed in with other ingredients of the compound and dispersed by roller mill. At times, the company has also coated finished products with the additive.

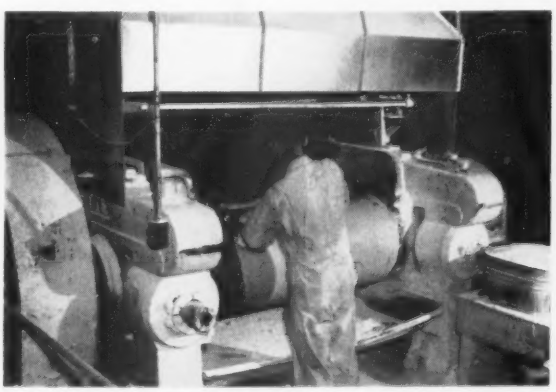


FIG. 2—The Minnesota Rubber Co., at Minneapolis, Minn., disperses molybdenum disulfide into rubber compounds during roller milling for specialty parts production.

EDITORIAL

Bigger Supermarket Carts?

► A recent news story published in a business newspaper pointed to the fact that a tire company has completed arrangements with a supermarket chain that will lead to the appearance of automobile supply centers at supermarkets. The objective is to catch the mobile trade on its one-trip shopping jaunts to market centers that are mushrooming throughout the country.

Historically, tires and accessories have been marketed in many different ways, but this supermarket approach is rather new. The story in the newspaper left many questions unanswered. For example, who will mount the tires purchased? Be that as it may, a new dimension has been added to the marketing of tires.

We all know, of course, that many rubber and plastics products have found their way into supermarkets. One can now buy garden hose, dish drainers, coasters, hardware supplies and what-not in supermarkets—but it strikes us that the introduction of tires into the picture is rather a unique approach.

Frankly, we have been unable to make up our editorial minds as to whether the current move will work to the benefit or the discomfort of the tire manufacturer. If this is the wave of the future, the tire manufacturer may have to realign his merchandising and distribution techniques. His marketing techniques may be radically different—his "thinking" may have to be changed.

Within the past decade, a technological revolution has swept rubber compounding, a revolution which has seen art giving way to science. The rubber industry, as a whole, has benefited from this revolution and there is nothing at this point to suggest that the marketing of tires will not be enhanced by a supermarket approach.

We do feel, however, that new methods deserve unbiased evaluation. The ultimate consumer must come to some conclusion as to whether new marketing techniques will work to his advantage in the long run. The tire distributor must concern himself with another set of problems. The rubber manufacturer should consider whether supermarket sales will maintain elements of service now available through regular channels. He should think about the reputation of the brand name he has built through the years. "Supermarketing" is rather an anonymous operation. What happens to the image the tire manufacturer has created?

Let us not be misunderstood here. We call for no status quo. We ask only pertinent or impertinent questions. The tire manufacturer, the tire distributor, and ultimately the public must furnish the answers.

EXPORTS

► Early in 1961 the United States will enter another period of negotiations with competing industrial nations at Geneva, in connection with tariffs negotiated under GATT (General Agreement on Tariffs and Trade). Now is a good time for companies in the rubber industry to think of increasing their share of overseas markets.

Representatives of the rubber and rubber products industries recently outlined to U.S. Department of Commerce officials the problems they face in seeking to expand export sales.

The principal point emerging from this meeting—and other meetings called by Department of Commerce officials with representatives of various industries—is that all export business is *individual*, just as, in this country, *all sales are local*. The underlying fact which exporters, and would be exporters, of either raw synthetic or finished rubber products, should bear in mind is that Uncle Sam cannot develop a market for any specific company, but that each company must develop a market for its own product or products.

Biggest Competitors

Officials say that our biggest competitors may not be the Russians but our own friends in the Western community of nations who are building up facilities and fighting for new markets all the time.

Rubber industry export sales fall largely into two general categories, according to the Chemical and Rubber Division, Business and Defense Services Administration, U. S. Department of Commerce. These are:

(1) *Synthetic rubber*, in which the export volume has been increasing, year by year, since Uncle Sam sold the plants to private industry, which finally took over completely in 1955.

In 1954, export sales of raw synthetic were $25,000,000.
In 1955: $62,000,000.
In 1956: $97,000,000.
In 1957: $123,000,000.
In 1958: $117,000,000.
In 1959, they advanced steeply again to $170,000,000. It is felt that export sales in 1960 will be on par with 1959 sales.

This almost-uninterrupted climb to new export height for raw synthetic, mostly butadiene, has been due to the high fixed price of natural rubber which has well-nigh priced itself out of many markets. In addition, U. S. companies have increased shipments of synthetics to their own affiliated companies in other nations, particularly plants in Western Europe.

(2) *Rubber products*, in which the trend has been mixed, mostly downward, during the same years in which synthetic was gaining in exports. According to BDSA officials, here is how various types of rubber and rubber products have moved, from an export standpoint, in the years from 1954 to 1959.

- Compounds and masterbatches have moved up from 2.7 million in exports in 1954 to $8.5 million in 1959.
- Reclaimed rubber has moved upwards from $2.3 million in 1954 to $3.2 in 1959.
- Tires and tubes consistently have moved downwards as principal U. S. producers open new affiliates overseas.
- Tread rubber exports have followed the trends in tires, and for the same purposes, since camelback now is being made in many other countries by U. S. producers.
- Druggists' and medical sundries consistently have moved upwards in the years 1954 through 1959.
- Belts and belting also have moved higher, year by year.
- Rubber hose, on the other hand, has followed the downtrend in exports characterizing tires, due to manufacture by U. S. producers in overseas plants.
- Mechanical rubber goods have gone up in volume, year by year, and have not increased relative to the total of rubber and rubber products exports.

Export Trends in Rubber

- Synthetic rubber: export volume has increased steadily from $25 million in 1954 to $170 million in 1959
- Rubber products: export trend has been mixed, mainly downward
  - compounds and masterbatches up ↑
  - reclaimed rubber up ↑
  - tires and tubes consistently down ↓
  - tread rubber down ↓
  - druggists and medical supplies up ↑
  - belts and belting up ↑
  - rubber base down ↓
  - mechanical rubber goods up ↑
  - heels and soles up ↑
  - sponge rubber up ↑
  - rubber shoes down ↓

- Heels and soles have moved relatively well, increasing both volume-wise and in relation to the total exports of the industry.
- Sponge rubber products have been moving well into export markets and bringing in millions of dollars on an exchange basis.
- Rubber shoes have not done well, because of the high labor cost involved in manufacturing such shoes. Japan, Hong Kong, and other producers paying only a few cents an hour for labor are able to drive U. S. made rubber shoes out of the overseas markets, on a straight price basis.

At the Department of Commerce meeting, rubber industry spokesmen cited low labor costs in virtually all other countries as a competitive factor with U. S. rubber products.

Some synthetic rubbers suffer in certain Western European countries, they also declared, because the chemical structure of the synthetics causes tariffs as high as 30 per cent.

Producers of syntheic rubbers also urged that their product be freed from export control by Uncle Sam. They say that the time consumed in obtaining licenses sometimes delays U. S. shipments and that it definitely places the U. S. industry at a competitive disadvantage with foreign concerns.

The rubber and rubber products manufacturers also urged that U. S. steamship rates be brought into line with those of foreign countries. The low rates of foreign steamship companies give producers there an advantage over those in this country.

If a rubber producer or rubber products manufacturer reaches the stage at which its officials are definitely interested in selling to other nations, and have made the study which convinces them that there *are* markets abroad (and *where* the ground is most fertile for their efforts), and the company has set up a working export organization, somewhere along the way, in these studies, the necessity to contact the Office of Trade Promotion, Bureau of Foreign Commerce, U. S. Department of Commerce, will soon become apparent.

In consulting with officials of the OTP, the officials, or their representatives, will be given the general guidelines which Department of Commerce gives to all businessmen who have reached the point of "going export."

A Good Contact

At the same time, these officials will have made contact with the Chemical and Rubber Division, BDSA, U. S. Department of Commerce, whose director, Dr. Lowell B. Kilgore, might be an excellent point of contact, along with his associates.

The most logical way for a newly-interested company to proceed, the experts say, is to develop one market at a time in other nations, just as the company originally developed one market at a time in state after state in the U. S. This concentration on a specific target country, or an area inside a specific country, gives the exporting company time to build valuable experience, without scattering its personnel or resources too widely. If the project in one country pays off, then the company will be encouraged to open up in another country.

Uncle Sam, other than rendering technical information, advice and counsel, has no program at all for financial assistance to companies that want to "go export." However, Congress at various times has considered the possibility of setting up a program of long-term, low-interest loans. These loans would be available either directly in this country to producers, or to other nations, providing that most-favored-nation treatment would be given to manufacturers in this country.

Latin America has a large potential. More and more companies are observing the developing market for U. S. made products there, and each bit of progress and economic penetration means that the pace will quicken. Canada also is becoming more and more a consumer of U. S. made goods, due to our long, mutual border and the close and friendly ties the U. S. has always had with our neighbor to the North.

Africa and the Middle East are opening up, almost explosively, from a trade standpoint. For those who really want to run into competition, there is always Germany, Scandinavia, Great Britain, France, and Italy. And there are expanding economic islands, with growing commercial potential, throughout the far reaches of the Pacific, including the Republic of Korea, Japan, Thailand, and India.

But newcomers to the field should be cautioned again, observers say, to spot their targets, a country at a time. The world is a big place, but no company sells the world. It sells to specific markets, in specific countries.

Should You "Go Export"?

- Constant pressure toward world trade is difficult to withstand.
- Many businesses must continue to expand to achieve optimum efficiency.
- Even selling 10 per cent overseas may prove "cream" in these days of high "break-even" point.

Steps in "Going Export"

- The first step is to conduct a study of your economic possibilities.
- If this report is favorable, set up one man in charge of export sales. Later he can develop a staff and direct activities.
- Contact the Office of Trade Promotion, Bureau of Foreign Commerce, of the U. S. Department of Commerce. This will lead to the Chemical and Rubber Division, Business and Defense Services Administration, of the Commerce Department. Dr. Lowell B. Kilgore, director, and his associates, may be an excellent point of contact.
- Develop one market at a time, just as the company originally developed one state at a time. This gives time to build valuable experience without scattering personnel or resources too widely.

Some Barriers in "Going Export"

- High tariffs in Western Europe hurt synthetic rubbers.
- Latin American tariffs keep out American goods although local industry cannot meet the demand.
- British Commonwealth and other trade blocs restrict sales.
- Low labor costs in other countries.
- Regulations in each country.
- Currency exchange.
- Language.

Where Are the Markets?

- European markets such as Germany, Scandinavia, Great Britain, France, and Italy offer stiff competition.
- Latin American potential is huge.
- Africa and the Middle East are opening up.
- Asia is marked by growing economic islands: Korea, Japan, Thailand, and India.
- Canada is becoming more a consumer of American goods.

NEWS REPORTS

and industry activities

OCTOBER, 1960

Healthy Situation in Synthetic Reported

► In his fifth annual report to Congress on "Competition in the Synthetic Rubber Industry in the United States," William P. Rogers, Attorney General of the United States, reports solid gains and a healthy competitive situation. Mr. Rogers notes that 1959 was an eventful period for the synthetic rubber industry. Rebounding from a recession year of slack demand, it rose to a new plateau of operations pitched to a scale of demand never before encountered.

The report, in its summary of 1959's developments, stressed, first of all, higher production and higher consumption, and the particularly important growth role synthetics played with production at the all-time high of 1,380,000 tons, and the higher than usual demand for our synthetic exports which cannot, however, be taken as a recurring condition. As far as particular types of synthetics were concerned, polyisoprene and polybutadiene were cited as making heavy gains in popularity.

On the patent scene, the ruling that General Tire and Rubber was entitled to a product patent on its widely-used oil-extended production method, was of major importance, with all the implications still not clear; the indications were that only court actions in the form of infringement suits could further clarify the benefits General has actually gained by the legal victory.

Another case which is still arousing interest is a patent infringement suit filed by Foster Grant Co., Inc., and others against Odessa Styrene Co. and others. It is charged that through the hiring of a Foster Grant employee as superintendent of its proposed styrene plant, "Odessa wrongfully obtained secret and confidential information, to be made the

Table 1—The Synthetic Rubber Industry in 1959

S-Type Rubber Plants

Company	Plant location
American Synthetic Rubber Corp.	Louisville, Ky.
Copolymer Rubber and Chemical Corp.	Baton Rouge, La.
Dewey & Almy Chemical Division, W. R. Grace & Co.	Cambridge, Mass.; Owensboro, Ky.
Firestone Tire & Rubber Co.	Akron, Ohio; Lake Charles, La.; Pottstown, Penna.
General Tire & Rubber Co.	Odessa, Tex.
Goodrich-Gulf Chemicals, Inc.	Port Neches, Tex.; Institute, W. Va.
Goodyear Tire & Rubber Co.	Akron, Ohio; Houston, Tex.
International Latex Corp.	Dover, Del.
Phillips Chemical Co.	Borger, Tex.
Shell Chemical Co., Division of Shell Oil Co.	Los Angeles, Calif.
Texas-U. S. Chemical Co.	Port Neches, Tex.
United Rubber & Chemical Co.	Baytown, Tex.
United States Rubber Co.	Naugatuck, Conn.

Butyl Rubber Plants

Humble Oil & Refining Co.	Baton Rouge, La.; Baytown, Tex.

Neoprene Rubber Plants

E. I. du Pont de Nemours & Co.	Montague, Mich.; Louisville, Ky.

N-Type Plants

Firestone Tire & Rubber Co.	Pottstown, Penna.
The B. F. Goodrich Co.	Cleveland, Ohio; Louisville, Ky.
Goodyear Tire & Rubber Co.	Akron, Ohio
International Latex Corp.	Dover, Del.
United States Rubber Co.	Baton Rouge, La.

Butadiene Plants

Copolymer Rubber & Chemical Corp.	Baton Rouge, La.
Dow Chemical Co.	Freeport, Tex.; Bay City, Mich.
Firestone Tire & Rubber Co.	Orange, Tex.
Goodrich-Gulf Chemicals, Inc.	Port Neches, Tex.
Humble Oil & Refining Co.	Baton Rouge, La.; Baytown, Tex.
Odessa Butadiene Co.	Odessa, Tex.
Petroleum Chemicals, Inc.	Lake Charles, La.
Petro-Tex Chemical Corp.	Houston, Tex.
Phillips Chemical Co.	Borger, Tex.
Shell Chemical Co., Division of Shell Oil Co.	Torrance, Calif.
Standard Oil Co. of California	El Segundo, Calif.
Texas Butadiene and Chemical Corp.	Channelview, Tex.
Texas-U. S. Chemical Co.	Port Neches, Tex.
Union Carbide Corp.	Charlestown, W. Va.; Texas City, Tex.; Seadrift, Tex.; Institute, West Va.

Styrene Plants

Cosden Petroleum Corp.	Big Springs, Tex.
Dow Chemical Co.	Freeport, Tex.; Midland, Mich.
Foster Grant Co., Inc.	Baton Rouge, La.
Koppers Co., Inc.	Kobuta, Penna.
Monsanto Chemical Co.	Texas City, Tex.
Odessa Styrene Co.	Odessa, Tex.
Shell Chemical Co., Division of Shell Oil Co.	Los Angeles, Calif.
Union Carbide Corp.	Institute, W. Va.

subject of patent application, on the improved equipment, techniques, and processes for manufacture of styrene by the dehydrogenation of ethylbenzene which had been developed during 1952-56 in the construction and early operation of Foster Grant's styrene plant at Baton Rouge." The case is as yet undecided.

Also touched on in the brief summary that introduces the report are the tentative plans for an International Synthetic Rubber Producers Institute, to be set up in New York State, with international representation. "It is anticipated that initial membership will include almost all the domestic S-type producers, as well as the Canadian Polymer Corp., the British International Synthetic Rubber Corp., and Shell International Chemical Co., Ltd. (operating a plant in the Netherlands), the Italian company ANIC and the German Chemische Werke Huels."

Table 2—S-type Rubber Capacity, by Company 1955, 1958-60

(thousands of long tons)

Company	May 1, 1955	Dec. 31, 1958	Dec. 31, 1959	Anticipated capacity Dec. 31, 1960
Goodyear (2)	146.5	255.6	270.0	270.0
Firestone (3)	129.6	231.5	231.5	251.5
Goodrich-Gulf (1)	95.0	247.0	272.5	272.5
Shell (6)	94.0	126.0	104.0	104.0
Texas-U. S. (4)	88.0	127.0	143.0	156.0
Phillips (5)	69.4	118.0	121.5	121.5
United Rubber (9)	62.0	69.8	69.8	69.8
Copolymer (7)	49.0	75.0	95.0	133.0
A. S. R. C. (8)	44.0	68.5	75.0	75.0
U. S. Rubber (11)	22.2	30.0	32.0	32.0
General (10)		54.0	54.0	54.0
All other		7.7	14.8	20.3
Total	799.7	1,410.1	1,483.1	1,559.6

Competitive Situation

Competition in general-purpose rubber, accounting for 80 per cent of the synthetics, was reported at a 1,130,000 ton production level, up "from a 1958 recession decline to 872,000 tons, with the big producers holding their comparative places, and no major competitive shifts." Yet production, it was pointed out, was still only at little more than 75 per cent of capacity. Goodrich-Gulf surpassed Goodyear slightly in capacity increase, as was expected, but Copolymer, a smaller company, reported the biggest capacity build-up.

It is pointed out, in addition, that "Goodyear and Firestone continue to hold the largest shares of production and sales, leading by a substantial margin. However, both show slight declines during 1959. Despite gains by Goodrich-Gulf, the collective share of these three largest companies dropped, for the second straight year, by 2 per cent in both categories. Shell's gains reflect its resurgence of strength in the West Coast market noted below. However, the biggest over-all gains were made by such smaller companies as Copolymer and General, the newest producer in the field."

As regards production by categories of different types of synthetics, oil-masterbatch seemed to be overtaking cold rubber rapidly, while oil-black masterbatch has jumped to 10 per cent of S-type output. Synthetic specialization was also reported to be making rapid strides, with diversification rapidly coming into its own. Output of latex, for instance, shared in the booming production of 1959, with domestic consumption rising from 150,000 tons in 1958 to almost 180,000 tons, in spite of competition from materials like urethane for the production of foam rubber. Natural latex, for the first time, dropped below synthetic in consumption.

Sales Picture Bright

The sales picture in the synthetic market was bright also, with captive sales caused by the existance of the Big Five tire companies declining to a 51.5 percentage of total domestic sales. Actual marketing methods remained much the same. As far as geographical competition in synthetics was concerned, competition on the West Coast which had lately showed a tendency to build up, in

Table 3—Market Position of S-type Rubber Producers, 1955, 1958-59

Company	Percentage of capacity			Percentage of production			Percentage of domestic sales		
	May 1, 1955	Dec. 31, 1958	Dec. 31, 1959	May-Dec. 1955	1958	1959	May-Dec. 1955	1958	1959
Goodyear (2)	18.3	18.2	18.2	17.7	24.1	23.9	23.0	22.2	20.0
Firestone (3)	16.2	16.4	15.6	19.1	19.4	17.1	19.9	18.3	17.9
Goodrich-Gulf (1)	11.9	17.5	18.4	12.7	12.2	12.7	10.3	11.2	11.8
Shell (6)	11.7	8.9	7.0	10.2	6.3	7.2	10.6	6.9	7.1
Texas-U. S. (4)	11.0	9.0	9.6	12.0	9.2	9.6	10.4	10.3	10.2
Phillips (5)	8.7	8.4	8.2	7.1	8.1	7.7	8.0	7.0	7.2
United Rubber (9)	7.8	5.0	4.7	3.7	4.2	3.5	5.0	6.7	5.5
Copolymer (7)	6.1	5.3	6.4	6.4	6.6	7.0	5.6	7.9	9.0
A. S. R. C. (8)	5.5	4.9	5.1	6.6	4.4	5.2	5.3	4.6	5.0
U. S. Rubber (11)	2.8	2.1	2.2	2.6	2.2	1.9	1.9	2.3	1.8
General (10)		3.8	3.6		3.1	4.0		2.4	4.2
All others		0.6	1.0	1.9	0.2	0.2		0.2	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Companies are listed in order of their relative size at the time plants were transferred to private ownership. Figures listed after company name identifies the rank in order of 1959 S-type capacity.

spite of an overwhelmingly dominant position still occupied by Shell Chemical in that area, now seemed to reverse once again.

"In 1959 the West Coast market continued to expand in importance, reaching a full 10 per cent of total domestic sales. In this market Shell managed to regain a limited portion of the ground lost the previous year, rising from 59.5 to 64.4 per cent of area sales. General and Copolymer also gained ground slightly, while Goodyear's share declined substantially. Shell's sales to the major tire plants also improved, rising from 52 to 54.5 per cent of its area business. Further, Shell accounted for almost 80 per cent of sales to independent West Coast fabricators, who continued to represent about 37 per cent of the area market."

In connection with the raw materials, butadiene and styrene, outside uses were appearing for butadiene, and a rising export market for the product was making its appearance. However, a serious over-capacity still continued. Unlike butadiene, styrene has always been in demand outside the rubber industry.

Specialty Rubbers

The specialty synthetics, butyl, neoprene, and nitrile, showed slight gains in production over 1958, accounting collectively for 18 per cent of the synthetic rubber market. Neoprene took 9 per cent; butyl, 6 per cent; and nitrile, 3 per cent. According to the Attorney General's report: "It seems clear that possibilities for greatly increased demand, without which no new domestic competitor can be anticipated, will depend in large part upon the degree of public acceptance of the new butyl passenger tire . . . Of the major tire companies only Firestone, one of the two producers of the Atlas Bucron tire for Esso's account, has announced plans to make its own butyl premium tires in 1960."

As far as neoprene and nitrile are concerned, "Domestic capacity for these synthetics amounts to about 186,000 tons, with planned expansion in 1960 expected to add another 30,000. Production rose steeply to almost 168,000 tons, some 38,000 more than in 1958. Domestic sales also jumped some 27,000 tons over 1958 to 114,000 tons, as internally consumed production declined from 7,000 to 4,500 tons."

Surveys of small business in the rubber industry indicated that most fabricators expressed satisfaction in obtaining all their synthetic rubber requirements, with all companies answering queries indicating a belief that they had "obtained a fair share of synthetic rubber at fair prices." According to the report, "the 1959 developments most noted were the increasing technical advice and services by the producers; the technological breakthrough in natural-synthetic rubbers which promise to be cheaper than natural rubber; the availability of Shell's polyisoprene rubber for evaluation purposes; the increased research to improve quality and to produce more and better grades of S-type rubber; the greater number of companies making black masterbatch types of rubber; and the improvement in processing technology."

Kenneth B. Cary

Richard A. Murphy

Form Woodbridge Plastics

► A new company, Woodbridge Plastics, Inc., Woodbridge, N. J., has been formed to provide custom compounding of vinyl and polyethylene for the wire and cable, vinyl shoe, profile extrusion, and injection molding industries. Kenneth B. Cary is president of the new company, and Richard A. Murphy is vice-president, sales. According to the company, equipment installed in the plant located in Woodbridge, includes a Banbury mixer, open mills, and extrusion, dicing and dry blending facilities. Production is scheduled to begin in October, 1960.

AMSCO Changes Address

► American Mineral Spirits Co. has announced that it has moved its Chicago office to 200 South Michigan Avenue. The office's new telephone number is WAbash 2-4021.

Heads AIIE Chapter

► William J. Muhlbacher, a senior methods and standards engineer of Firestone Tire & Rubber Co., Akron, Ohio, has been elected president of the Akron Chapter of the American Institute of Industrial Engineers for the current year. He succeeds Robert L. Griffiths, superintendent of power and processing for Diamond Crystal Salt Co., St. Clair, Mich., who has been appointed to the chapter's board of directors. Other officers named are: Joe A. Dumbauld, *vice-president;* Arthur L. Bowles, *secretary;* and William Emanuel, *treasurer.* James T. Austin and Armando Zanin have been named to the board of directors. Mr. Dumbauld is a statistical analyst for Goodyear Aircraft Corp.; Mr. Emanuel, an industrial engineering trainee for Firestone; Mr. Bowles, a senior methods engineer in the Firestone General Methods and Standards Department; Mr. Austin, an industrial engineer at Goodyear; and Mr. Zanin, manager of industrial engineering for the Lamb Electric Co., Kent, Ohio.

A.C.S. Rubber Division Holds 78th Meeting; New Officers Announced for 1960-61 Season

Four technical sessions and the announcement of the Goodyear Medalist for 1961 feature New York gathering

► The 78th Meeting of the Division of Rubber Chemistry of the American Chemical Society, held on September 14-16 at the Hotel Commodore in New York City, featured a full program of papers and the usual organization activities. The Rubber Division meeting was held in conjunction with the 138th meeting of the parent society. Under these circumstances, no accurate count of Rubber Division registration is available. However, it is reliably estimated that approximately 1,100 members and guests of the Rubber Division were in attendance at the meeting.

A feature of the meeting was the announcement of new officers for the 1960-61 season who had been elected in a letter-ballot conducted earlier. The new officers are: *Chairman*—W. S. Coe (U. S. Rubber); *Vice-Chairman*, George E. Popp (Phillips Chemical); *Secretary*, Louis H. Howland (Naugatuck Chemical); *Treasurer*, Dale F. Behney (Harwick Standard). H. J. Osterhoff (Goodyear) becomes director-at-large.

Technical Sessions

The technical portion of the meeting was divided into four sessions. The first of these, held on Wednesday afternoon, September 14, was concerned with new polymers. This session was chaired by W. J. Sparks (Esso Research), division chairman. At this session the first of two invited papers was presented. Dr. Maurice Morton (Akron University) spoke on "Recent Developments in Anionic Polymerization."

The second technical session was held on Thursday morning, September 15, with J. Rehner (Esso Research) as chairman. This session included seven papers, the first five of which constituted a symposium on "Reinforcement." W. S. Coe (U. S. Rubber), vice-chairman of the Rubber Division, presided over the third technical session, which was held on Thursday afternoon, September 15. Papers at this session were, in general, devoted to the subject of "Rubber Chemistry." It was at this session that the second invited paper was presented. Professor C. S. Marvel (University of Illinois) discussed "Recent Developments in High Temperature Rubbers."

The fourth, and final, technical session, was held on Friday morning, September 16. Past-chairman E. H. Krismann (DuPont), was in charge. A group of general papers was presented.

Readers should note that abstracts of all the papers presented at the meeting, including the invited papers, appeared in the July, 1960 issue of this journal. It was generally acknowledged by persons in attendance at the meeting that the technical sessions provided a wide and varied fare. Dr. E. Wasserman (Bell Telephone Laboratories), for example, described the formation of an entirely new class of chain-like molecules. These compounds, tentatively named "catenanes," are composed of large interlocking rings which are otherwise unbonded.

Juan Montermoso (QM Research) described "nitroso" rubber), a new elastomer which will give a degree of protection against nuclear blasts. The new material is not only said to be flameproof, but it extinguishes flame. Hershel Grinter and D. Scott Sears (Goodrich) discussed a new testing device that scrapes the hide of rubber samples to determine their abrasion resistance.

Lyle O. Amberg (Hercules Powder) spoke of his company's experimental EPR polymer (ethylene-

On the following three pages appear staff photographs taken at the various Hospitality Suites during the Rubber Division meeting. Do you see your picture?

Newly-elected Chairman Coe (left) presents a scroll to Past-Chairman Sparks (right).

Hospitality...

NOW—in the United States

THE FAMOUS SHAW INTERMIX
internal mixer becomes the . . .

MANUFACTURED, SOLD
AND SERVICED IN THE UNITED STATES FOR
THE RUBBER AND PLASTICS INDUSTRIES

by **ADAMSON UNITED**
AKRON, OHIO

THE INTERMIX was first introduced in 1932 by Francis Shaw & Co. Ltd., Manchester, England. It soon established its now famous reputation for rapid mixing and compounding of a wide range of materials, at low operating expense and *very little maintenance cost.* Today the Intermix is operating in many of the industrial centers of the world, dependably and economically mixing not only all normal rubber and plastic compounds, but many other materials, of which paint, cotton, fibre, ebonite, asphalt-asbestos and aqueous dispersions are examples.

A production size Intermix has been in operation in a U.S. plant of a major rubber manufacturer for approximately two years. Its high performance under American plant conditions, and in direct comparison with internal mixers of other makes, has led to increasing demands by the rubber industry for Intermix installations, field engineering and development services in this country. In response to the industry's interest, Adamson United Company is now manufacturing the Intermix on license from Francis Shaw & Co. Ltd. at its Akron, Ohio, plant where complete machine service, process laboratory facilities and engineering services are also maintained.

Manufactured in seven different sizes ranging from laboratory type units to large production machines, the various Intermix sizes are designated as K-0, K-1, K-2A, K-4, K-5, K-6, and K-7. (See table of specifications on page 6.) Some of the advantages of the Intermix which are important to rubber manufacturers are:

BETTER DISPERSION—Unique, patented design of interlocking rotors provides for *kneading* the material, rather than smearing it, as in other types of mixers. Results are fully masticated batches, with all ingredients completely dispersed.

SHORTER MIXING CYCLES—This kneading action of the rotors provides for *faster* blending of many compounds, than is obtained from mixers employing conventional smearing action. Greater production per shift is thus obtained.

COOLER MIXES—Because of a greater cooling area in contact with the mix, stocks can be dumped at much lower temperatures. The Intermix permits mixing of many low temperature stocks that can otherwise be done only on mills at much slower rates.

UNIFORM, HIGH QUALITY COMPOUNDS — Effective temperature control over all contact areas maintains proper plasticity of batch material during the mixing cycle, with resulting *uniform* high material quality.

LESS MATERIAL WASTE—Use of new split-ring type dust seals, and self-aligning spherical roller bearings to prevent axial shuttle of the rotors, virtually eliminates material waste due to leakage along rotor shafts.

MINIMUM MAINTENANCE REQUIREMENT—The ability of the Intermix to produce dependably through the years with no breakdowns or major repairs is known and appreciated among its many users. Basic design and quality-controlled construction from materials best suited to the purpose, are primary reasons. Just a few of the many design and operating features that contribute to the higher production and lower operating cost of the Intermix are described in more detail on following pages.

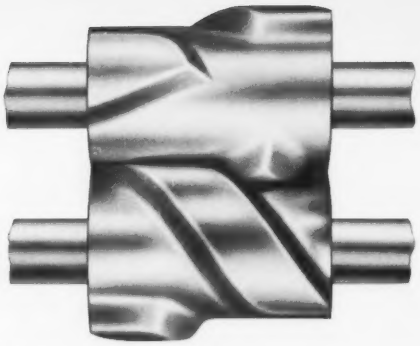


Fig. 1

INTERLOCKING ROTORS — Mixing and blending of compounds is done by **kneading** the batch between the rotors — not by "smearing" the batch between the rotors and the chamber walls. The result is faster, more thorough mixing, with practically no abrasive wear on the chamber walls.

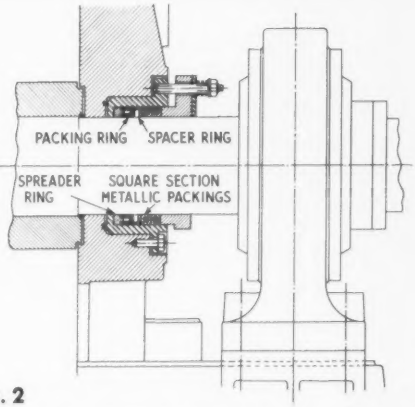


Fig. 2

Because Intermix rotor positions are positively fixed both radially and axially by anti-friction roller bearings, the readily accessible dust stop assemblies are not subjected to shaft "float" or "shuttle." Thus, only routine cleaning is required to hold maintenance to a minimum.

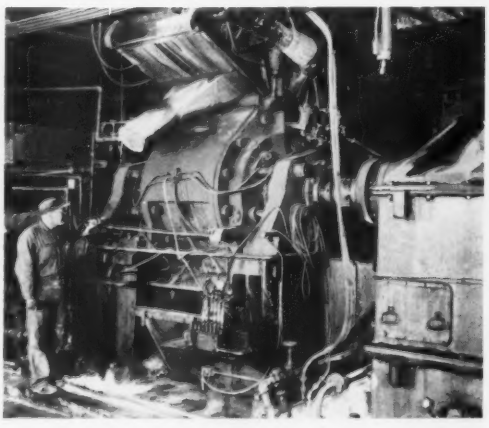


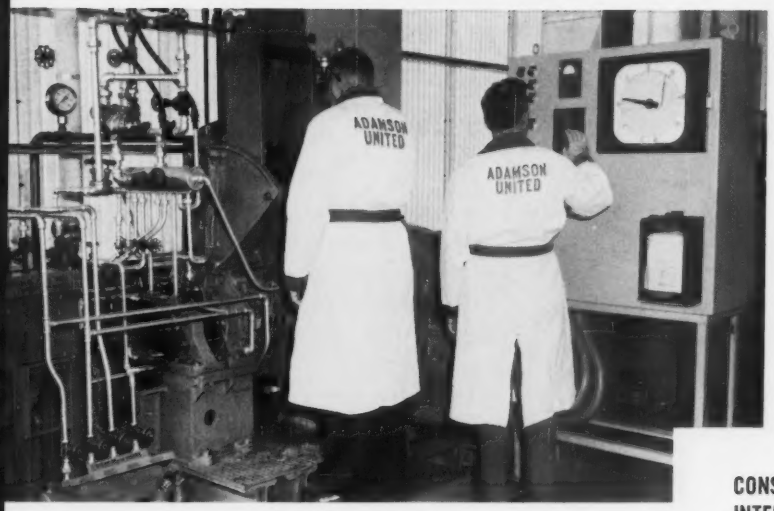
Fig. 3

This Size K-7 Intermix has been in use at B. F. Goodrich Co., Akron, Ohio, for approximately two years.

ADAMSON UNITED

OFFERS COMPLETE PROCESS ENGINEERING TO HELP YOU

- **TEST YOUR MATERIALS**
- **DETERMINE YOUR MIXING REQUIREMENTS**
- **PLAN YOUR INTERMIX INSTALLATIONS**



▲ Adamson United Company engineers and technicians work directly with the technical staffs of rubber manufacturers, assisting in compound evaluation, and development of Intermix plant installations. This partial view of the Adamson United processing laboratory shows a K-1 Intermix in operation.

In addition to our engineering and plant facilities for manufacturing the Intermix, we also maintain a processing laboratory, staffed and equipped, to assist rubber manufacturers in evaluating the Intermix in relation to their specific production requirements.

Here, with the assistance of experienced Adamson engineers and technicians, manufacturers can determine not only the performance capabilities of the Intermix, but also ascertain the production requirements of their compounds, test various mixes and materials, or experiment with new processing techniques and the development of new products. Complete privacy is assured where development projects are of a confidential nature.

Adamson engineers are thoroughly familiar with today's rubber processing problems. They are prepared to cooperate with your engineers on all phases of Intermix applications. They can recommend the size and type of Intermix that meets your mixing requirements, and help you plan your Intermix installations for highest operating efficiency.

CONSIDER THE ADAMSON-SHAW INTERMIX FOR YOUR NEXT INTERNAL MIXER —

You'll find it operating profitably for 97 companies, among which are:

THE B. F. GOODRICH COMPANY, THE GENERAL TIRE & RUBBER CO., PIRELLI GENERAL, MARLEY TILE CO., DUNLOP TIRE AND RUBBER CO., BAKELITE CO., LEYLAND & BIRMINGHAM RUBBER CO.

—in countries like these
THE WORLD OVER . . .

ENGLAND	GERMANY
INDIA	FINLAND
CANADA	AUSTRIA
RUSSIA	ITALY
U.S.A.	SCOTLAND
FRANCE	CHINA
DENMARK	POLAND
SOUTH AFRICA	MOROCCO
TURKEY	HOLLAND
YUGOSLAVIA	SPAIN
	MALAYA

The Shaw Intermix is being manufactured under license in the following countries:

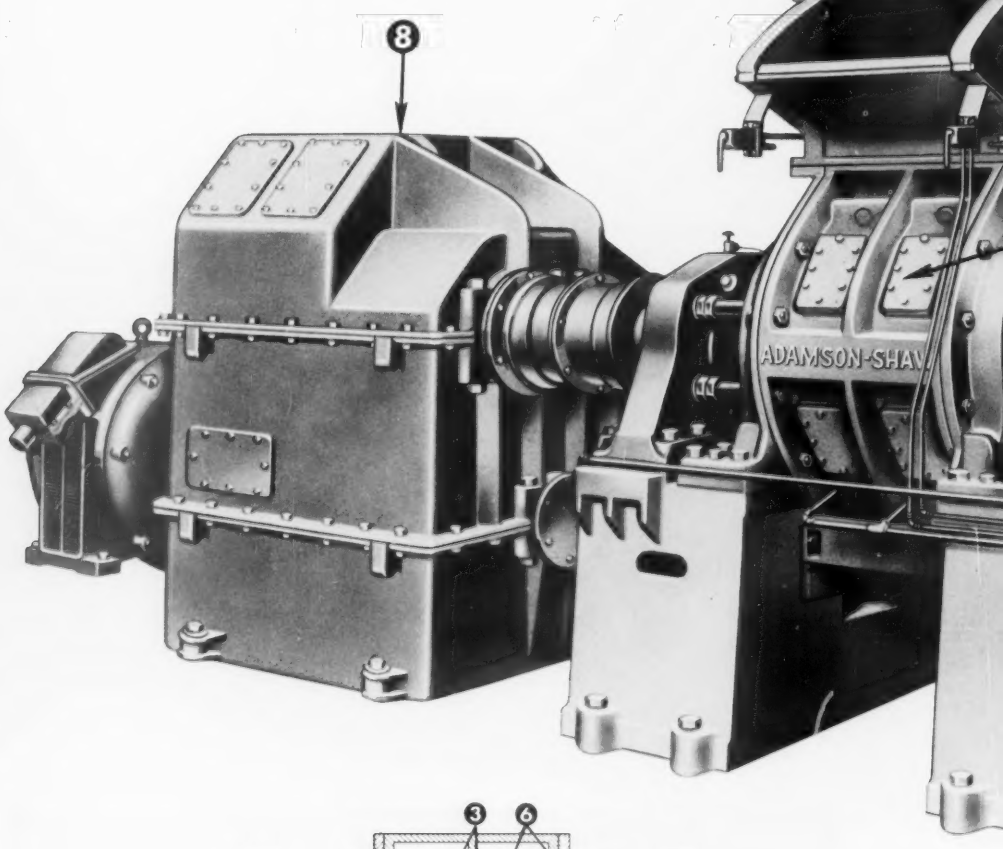
HOLLAND ★ ITALY ★ FRANCE
AUSTRALIA ★ U. S. A.

SEE TABLE OF MACHINE SIZES AND BATCH WEIGHTS ON PAGE 6

8 MAJOR DES

MAKE THE ADAMSON-SHAW
INTERMIX

THE MOST PRODUCTIVE INTENSIVE MIXER AVAILABLE TO RUBBER MANUFACTURERS — LONG, LOW-COST OPERATING LIFE MAKES IT THE LEAST EXPENSIVE . . .



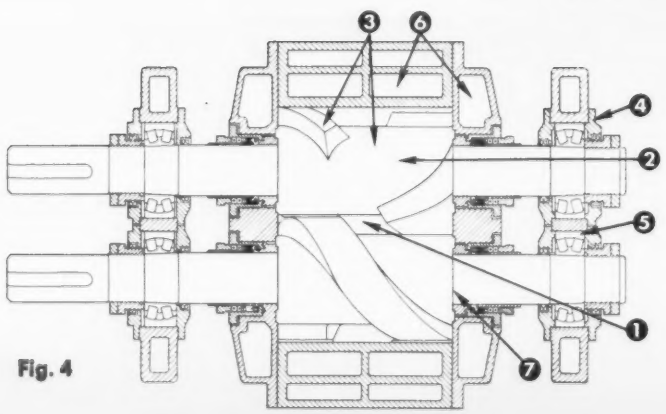
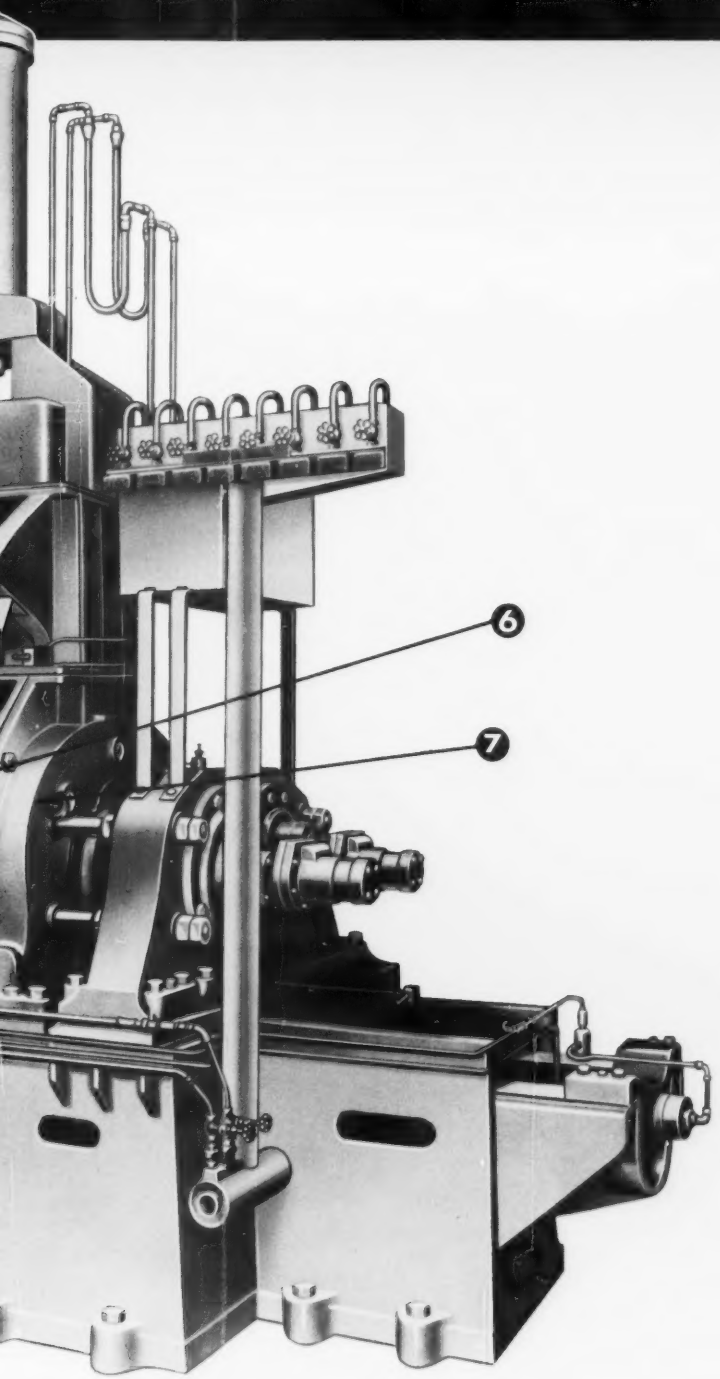


Fig. 4

SIGN FEATURES



1. INTERLOCKING ROTORS provide fast, thorough mastication of the batch. Mixing is accomplished *between the rotors*, instead of between chamber walls and rotors.

2. BI-METAL ROTOR CONSTRUCTION makes Intermix rotors stronger, longer wearing, and provides for more efficient cooling.

3. CORED ROTORS AND NOGS provide chambers for steam heating or water cooling, making possible more precise control of mixing temperatures.

4. ANTI-FRICTION BEARINGS on rotor shafts make substantial cumulative savings in operating cost, reduce maintenance, keep rotor shafts in "fixed" alignment.

5. FORCED FLOOD LUBRICATION of bearings insures their proper maintenance automatically, contributing to longer bearing life with original high efficiency maintained.

6. EFFICIENT COOLING over *all* surfaces in contact with the batch. Stocks requiring low temperature mixing are handled more efficiently on the Intermix because the chamber bodies, ends, gate and ram, as well as the rotors, are designed for effective cooling of stocks requiring low temperature mixing.

7. RENEWABLE WEAR PLATES at rotor ends can be removed quickly if replacement is ever necessary.

8. DRIVES—The Intermix is available with either a separately mounted Pinion Stand Drive, or with a bull gear type drive. The Pinion Stand Drive makes the Intermix more accessible for normal maintenance and offers longer gear train life. However, the lower cost bull gear drive is fully suitable for most compounds.

THE ADAMSON-SHAW **INTERMIX** IS AVAILABLE IN THE RIGHT SIZE AND DRIVE COMBINATION TO MEET YOUR MIXING REQUIREMENTS EFFICIENTLY AND ECONOMICALLY

TABLE OF MACHINE SIZES AND BATCH WEIGHTS

	Machine Size	K—0	K—1	K—2A	K—4	K—5	K—6	K—7
Approx. Batch Weight Lbs.	Crude Rubber	11 ozs.	5½	52	95	130	197	300
	Specific Gravity 1	¾	6	55	100	138	205	320
	Specific Gravity 1.3	1	7¾	72	130	180	270	420
	Specific Gravity 2.0	1¾	12	110	200	276	410	640
Net Volume Chamber	Cubic Inches	60	270	2,854	4,200	6,800	9,792	16,213
	Gallons	.26	1.3	3.96	18.23	29.6	42.53	70.26
Motor Horse Power*	Bull Gear Drive Single Speed	5 HP	50 HP	75 or 150	125 or 250	150 or 300	200 or 400	250 or 500
	Bull Gear Drive Two Speed		Variable	75—150	125—250	150—300	200—400	250—500
	Unit Drive Single Speed	5/10 HP	Speed	150 or 200	250 or 300	300 or 400	500 or 700	800 or 1000
	Unit Drive Two Speed		Drive	100—200	150—300	200—400	350—700	500—1000
Rotor Speeds RPM	Bull Gear Drive Single Speed	76	45/145	16 or 33	16 or 33	16 or 33	16 or 33	16 or 33
	Bull Gear Drive Two Speed	72/150	Variable	16—33	16—33	16—33	16—33	16—33
	Unit Drive Single Speed		Speed	33 or 44	33 or 44	33 or 44	33 or 44	33 or 44
	Unit Drive Two Speed		Drive	22—44	22—44	22—44	22—44	22—44
Approx. Overall Dimensions	Bull Gear Drive	5′6″ x 2′6″ x 7′0″ Geared Motor	14′6″ x 4′0″ x 6′6″	16′0″ x 8′6″ x 13′6″	23′0″ x 8′0″ x 15′6″	23′6″ x 11′0″ x 16′0″	28′6″ x 13′6″ x 20′0″	35′0″ x 12′0″ x 23′0″
Length x Width x Height	Unit Drive			16′0″ x 8′6″ x 15′6″	25′0″ x 8′0″ x 15′6″	26′0″ x 10′0″ x 16′0″	30′0″ x 15′0″ x 20′6″	38′6″ x 19′0″ x 23′0″
Approx. Net Weight in Lbs. excluding Motor	Bull Gear Drive	2,500	9,000	24,000	44,000	62,500	105,000	140,000
	Unit Drive	—	—	28,000	50,000	76,000	125,000	152,500

*Motor speeds are 1150 for 22 or 44 R.P.M. rotor speeds and 870 for 33 R.P.M. rotor speeds.

NOTES:

Relation between Horse Power and Speed is dependent upon type of Compound being mixed.

The table shows typical speeds and horse power range. Various other speeds and corresponding horse powers can be supplied.

ADAMSON UNITED COMPANY

730 Carroll Street • Akron 4, Ohio

Subsidiary of United Engineering and Foundry Co.

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- Washers
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- Calender Windups
- Complete Calender Accessory Equipment
- Embossing Calenders
- Pot Heaters
- Vulcanizers
- Autoclaves
- Hydraulic Presses
- Automatic Presses
- Belt Presses
- Compression Molding Presses
- Transfer Molding Presses
- Injection Molding Presses
- Laminating Presses
- Hardboard Presses
- Plywood Presses
- Chipcore Machines
- Rotocure Equipment
- Auxiliary Equipment
- Brake, Wheel and Tire Testing Machines
- Special Heavy Machinery

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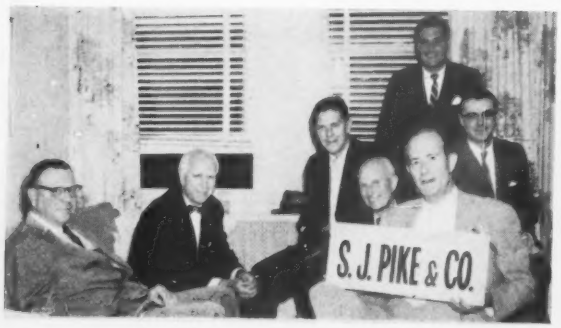
Conviviality . . .

Sociability . . .



propylene rubber) and declared that this new rubber appeared to meet or exceed many of the important properties of styrene rubber, natural rubber, butyl rubber, and other large volume commercial elastomers.

Wives of members in attendance at the Rubber Division meeting participated in an elaborate ladies' program which was planned by the parent society and by the Division. The ladies visited many New York landmarks, museums, theaters and shops.

The parent society also sponsored a chemical exposition at the Statler-Hilton Hotel in New York City. The Division of Rubber Chemistry maintained a booth at the exposition, displaying Rubber Division publications. Non-members were given an opportunity to join.

Business Meeting

The Business Meeting of the Rubber Division was held on Thursday morning, September 15, with Dr. Sparks presiding. The first order of business was the introduction of past-chairman Krismann who announced that Dr. H. A. Winkelmann (Dryden Rubber) had been selected as the Goodyear Medalist for 1961. Dr. Winkelmann will deliver his Goodyear Lecture at the Spring Meeting of the Society which will be held on April 18-21, 1961, at the Brown Hotel in Louisville, Ky. A complete biography of Dr. Winkelmann will appear in the November issue of RUBBER AGE.

A moment of silence was observed for those Rubber Division members who had passed away since the last meeting of the organization, including Malcolm Buffington, Walter Edsall, Donald Fraser and Charles P. Hall.

It was also announced that emeritus members of the organization now include G. L. Allison, G. H. Brittain, Seward Byam, R. D. Gartrell, C. D. Kennedy and Frederick Marchionna.

During the business meeting, Chairman Sparks presented a scroll denoting the appreciation of the Rubber Division to Dr. Roscoe Gerke (U. S. Rubber) retiring secretary of the Division. Dr. Gerke, in brief remarks, thanked the members for their cooperation and spoke of the work which remains to be done in the years ahead.

W. S. Coe (U. S. Rubber), vice-chairman of the Division, then presented a scroll to Dr. Sparks for his services to the Division as chairman. Dr. Sparks then announced the win-

Past-Chairman Sparks (left) presents a scroll expressing the appreciation of the Rubber Division to retiring Secretary Gerke (right).

Shown left-to-right above are retiring Secretary Gerke; newly-elected Treasurer Behney; Past-Chairman Sparks; newly-elected Chairman Coe and newly-elected Secretary Howland.

Dr. Sparks (left) is shown presenting the Best Paper Award to W. A. Smith (right).

Future Meetings of the Division of Rubber Chemistry American Chemical Society

Date	Place	Hotel
1961		
Apr. 18-21	Louisville, Ky.	Brown
Sept. 5-8	Chicago, Ill.	Sherman
1962		
Apr. 24-27	Boston, Mass.	Statler
Oct. 16-19	Cleveland, Ohio	Cleveland
1963		
May 7-10	Toronto, Canada	Royal York
Sept. 10-13	New York, N. Y.	Commodore
1964		
Apr. 28-May 1	Detroit, Mich.	Cadillac
Sept. 1-4	Chicago, Ill.	Sherman
1965		
———	Miami Beach, Fla.	———
Oct. 19-22	Philadelphia, Penna.	Bellevue-Strat.
1966		
May 3-6	San Francisco, Calif.	Fairmount
Sept. 13-16	New York, N. Y.	Commodore
1967		
May 2-5	Montreal, Canada	Queen Elizabeth
Sept. 12-15	Chicago, Ill.	Sherman

ners of the Best Paper Award given for the paper presented at the Buffalo, N. Y., meeting of the group this past Spring. The winners were W. A. Smith and J. M. Willis (Firestone) for their paper "Diene Rubber — Compounding and Testing." Mr. Smith accepted the award. (EDITOR'S NOTE: This paper appeared in full in the August, 1960, issue of this journal).

Secretary Gerke then presented a number of changes in the by-laws of the organization which have been recommended by the Executive Committee. Assistant Secretary Louis H. Howland (Naugatuck Chemical) read the changes which were unanimously adopted by the membership. One of the changes in the amended by-laws states that an associate member who is delinquent in his dues will not be automatically dropped from the rolls if his membership dues are not paid by April 15. After April 15 a member may be reinstated by paying an extra fee of $1.50.

Another change calls for a new title for the paragraph on emeritus members. The new title is "Members in Emeritus Status." In a paragraph dealing with functions and duties of the Executive Committee, a new amendment states that the Committee has the authority to "elect" rather than "appoint" councilors to represent the Division at Council Meetings of the A.C.S.

With reference to appointed committees, a new amendment states that it shall be the duty of the Nominating Committee to determine whether the nominees are *senior* members of A.C.S. and members of the Division . . . etc. In an amendment to the paragraph covering the Finance and Budget Committee, the new change states that any *senior* member is eligible for election to the Committee. Only members of the Society, *senior grade*, may hold an elective position.

It was also announced at the business meeting that the following Rubber Division members have been elected directors for the local groups named: *Akron:* M. H. Leonard (Columbian Carbon); *Boston:* G. W. Smith (DuPont); *Buffalo:* J. Frankfurth (U. S. Rubber Reclaiming); *Canada:* J. A. Carr (Dunlop); *Los Angeles:* D. C. Maddy (Harwick Standard); *New York:* C. V. Lundberg (Bell Telephone Laboratories).

John M. Ball presided over the luncheon meeting of the 25-Year Club.

Typical of the special activities arranged at the New York meeting was a visit to an outstanding New York restaurant through the courtesy of United Carbon. A number of participants are seen (left), while the hansom cab (right) was used to convey guests.

25-Year Club Meeting

A luncheon meeting of the 25-Year Club was held on Wednesday morning, September 14, with John M. Ball (Midwest Rubber Reclaiming) presiding. Over 200 members attended the meeting of the club which now numbers 500 members. Several new members were introduced at the meeting including Hap George (American Synthetic), Warren Jones (Firestone), Norman

Grace (Dunlop - Canada), and Al Laurence (R. T. Vanderbilt).

The honor of being the member with the most years' service in the rubber industry in attendance at the 25-Year Club luncheon fell to Clarence E. Bauer of the Hercules Tire & Rubber Co., Stamford, Conn., who has 54 years' service. Mr. Bauer began his career in the rubber industry with Goodyear, and in succeeding years worked with Diamond Rubber (now Goodrich), Swinehart Rubber, Norwalk Tire, Danbury Rubber and finally Hercules Tire (formerly Atlas Rubber Products). Mr. Bauer was presented with a money clip as a remembrance of the occasion.

Local Committee

The Local Arrangements Committee for the New York meeting had a particularly difficult time in seeing to it that all went off successfully. Matters were complicated by sudden meetings by political and union groups which pre-empted some meeting and hospitality rooms. To the credit of the committee, however, all functioned smoothly with a minimum of inconvenience.

E. S. Kern (R. T. Vanderbilt) served as chairman of the Local Arrangements Committee with H. J. Peters (Bell Telephone Laboratories) as co-chairman. The following members arranged the activities noted: *Ladies' Entertainment*, H. J. Due (St. Joseph Lead); *Meeting Rooms*, R. A. Emmett (Columbian Carbon); *Exposition Booth*, L. C. Komar (Titanium Pigment); *Information*, S. R. Shuart (Esso Engineering).

Pirelli Adds Plants

► Pirelli of Milan, Italy, has started construction of two new plants for standard automobile tires and mechanical rubber goods, as part of an expansion program. The plants are being built on property at Settimo Torinese, where the company's tube factory is located. The new plants, to cost over five billion lire ($8 million), are expected to go on stream by the summer of 1961. They will occupy an area of 807,000 square feet. As soon as the new plants have taken over company production of standard automobile tires, the Milan plant (Bicocca) will produce truck and special tires exclusively. The plant is being modernized in anticipation of the changeover. In addition, Pirelli's Tivoli plant (Villa Adriana), which produces tires for the Southern Italy market, has been enlarged and modernized.

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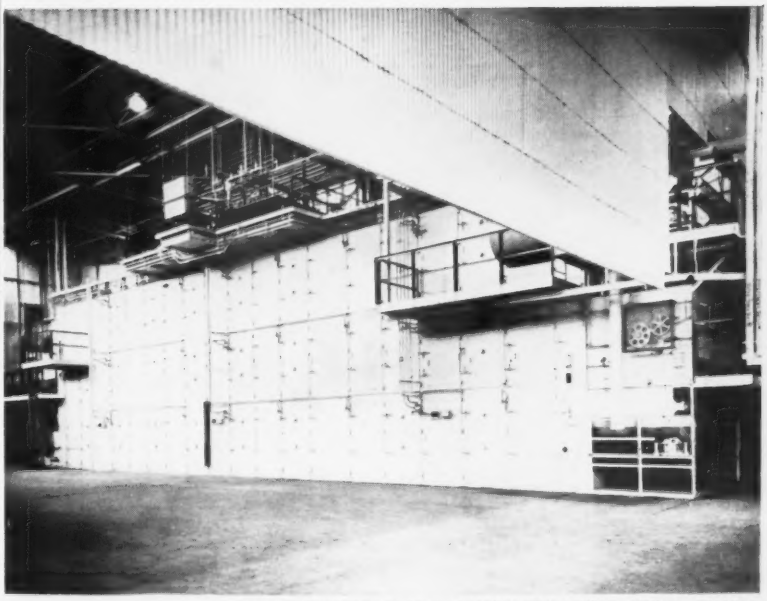

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W. H. Cain

R. W. Rice

Promoted by Firestone Synthetic

► Five men have been appointed to new positions with the Firestone Synthetic Rubber & Latex Co., Akron, Ohio. W. H. Cain, who has been plant manager at the firm's Lake Charles, La., synthetic rubber plant, has been promoted to the newly-created position of manager, process development, for all manufacturing operations of the synthetic rubber division. Succeeding Mr. Cain as Lake Charles plant manager is R. W. Rice, who has been serving as production manager at the plant.

P. A. Boley, formerly industrial relations manager at the Lake Charles facility, has been named production manager, and M. W. Littlewood, previously industrial relations manager at the firm's Orange, Texas, petrochemical center, succeeds Mr. Boley as industrial relations manager at Lake Charles. J. C. Utley, who has been safety engineer in the Industrial Relations Department at Orange, was named manager of industrial relations at the petrochemical center.

Mr. Cain graduated from the University of Nebraska in 1935 with a B.S. degree in chemical engineering. He joined Firestone in 1942 at its Akron synthetic rubber plant, and in 1943 he transferred to the Port Neches, Texas, synthetic plant, formerly operated by Firestone, as department manager. A year later he was named technical manager at that plant. In 1945 he became production manager, and then was named plant manager. He returned to the Akron synthetic division in 1948 as development manager, and was appointed plant manager at Lake Charles in 1951.

Mr. Rice joined Firestone in 1941 after receiving a B.S. degree in chemical engineering from Iowa State University. In 1943 he served in the Lake Charles plant and was named chief chemist in 1947. He served as technical manager from 1951 to 1956, when he became production manager of the plant.

Appointed by Xylos

► William J. Boyd has been named factory manager of the Akron plant of Xylos Rubber Co., Akron, Ohio, succeeding the late Paul W. Gamble. Mr. Boyd's position as chief chemist will be occupied by John L. Dum, who has been transferred to Akron from the Los Angeles plant where he was technical manager of the Fuel Cell Division. Mr. Boyd joined Firestone in 1929 as a trainee and was graduated from the University of Akron in 1933. He has been chief chemist for the past ten years. A 1934 graduate of Ohio State University, Mr. Dum received a master of science degree from the Chemical Engineering College in 1936, the year he started with Firestone. He became chief chemist in the Factory Compounding Division of Akron Plant 1 in 1953 and was transferred to Los Angeles in 1955.

Symposium Held in Russia

► An international symposium on problems in chemistry and physics dealing with high-molecular fusion was held in the Lomonsov Building of Moscow University from June 14 to 18. More than 1,200 scientists, representing almost 30 countries, attended to hear 160 papers on such topics as polymer synthesis, molecular cross-linking processes and chemical investigations into polymer structure, at three regular sessions.

In addition, two plenary sessions were opened by Academician V. A. Kargin at which papers were presented by Professors H. Mark and P. Doty of the United States, and Academician N. N. Semenov. The first special session was devoted to polymer synthesis and dealt with experimental data on synthesis, structure and linkage of various polyethers, polymers, their constituent chain links, and stereoregular polymers, some verging on the area of biological polymers.

The second session was devoted to the processes of polymerization and polycondensation and included problems in radical polymerization, research into the methodology and mechanisms of emulsified polymerization, the mechanisms of stereospecific polymerization and polymerization of anionic types. Some reports dealt with provisional results of research into radiation-induced polymerization.

The third section was concerned with research into such topics as block-copolymerization using different methods, experimental data, related chemical research into functional groups of molecules, data on the actual mechanism of various vulcanization systems, work on modification and alteration of natural polymers, and research on destruction and stabilization of polymers.

Opens Testing Facility

► A completely modern testing laboratory has been opened by Sprout, Waldron & Co., Inc., Muncy, Penna., to serve the processing industries. New equipment has been installed to help manufacturers to develop processing methods for new materials and find better ways for old methods. The laboratory is run on an appointment basis and customers are invited to participate in their test work. Service is on a fee basis. All laboratory work is reviewed, and a written report on each test is submitted to the customer.

14 Rubber Firms In Synthetic Group

► Fourteen synthetic rubber companies in the United States, Canada, England, and West Germany have completed the organization of the International Institute of Synthetic Rubber Producers. Representatives of two companies from Italy and Japan also participated in the establishment of the Institute, but have not yet formally joined it, pending approval by their respective boards of directors.

Manufacturers in the United States who are members include Firestone Synthetic Rubber & Latex Co., Goodyear Tire & Rubber Co., U. S. Rubber Co., Goodrich-Gulf Chemicals, Inc., American Synthetic Rubber Corp., Copolymer Rubber & Chemical Corp., General Tire & Rubber Co., Phillips Chemical Co., United Carbon Co., and Shell Chemical Co.

Members outside the United States are Polymer Corp., Canada; International Synthetic Rubber Co., and Shell International Chemical Co., Ltd., England; and Chemische Werke Huels A.G., Germany. The two firms which have not formally joined the Institute are A.N.I.C., Milan, Italy, and Japan Synthetic Rubber Co., Tokyo.

At a recent meeting of the Institute, the following officers were elected: *President*, Thomas C. Cubbage (Phillips Chemical); *Vice President*, Judson T. Black (Polymer Corp.); *Secretary*, George Hackim (General Tire); *Treasurer*, James C. Roberts (Firestone Synthetic Rubber & Latex). Bancroft Henderson, former president of American Synthetic Rubber Corp., is serving as managing director of the Institute.

To Review Albert Claims

► Sydney L. Albert has entered another phase of one more legal battle, this time concerning Albert-Harris Inc., former Akron, Ohio, firm, with the Ohio Supreme Court's agreement to review Mr. Albert's claim of ownership of the patents held by the defunct company. Mr. Albert bases his claims on having invested $1 million in the firm which he and Edward J. Harris organized, and which subsequently went bankrupt. The lower courts, after hearing the case last summer, had ruled that Mr. Albert owned only seven of the patents, and that the firm, Harris, and Adolph Frohlich—a German inventor hired by the firm, owned the rest.

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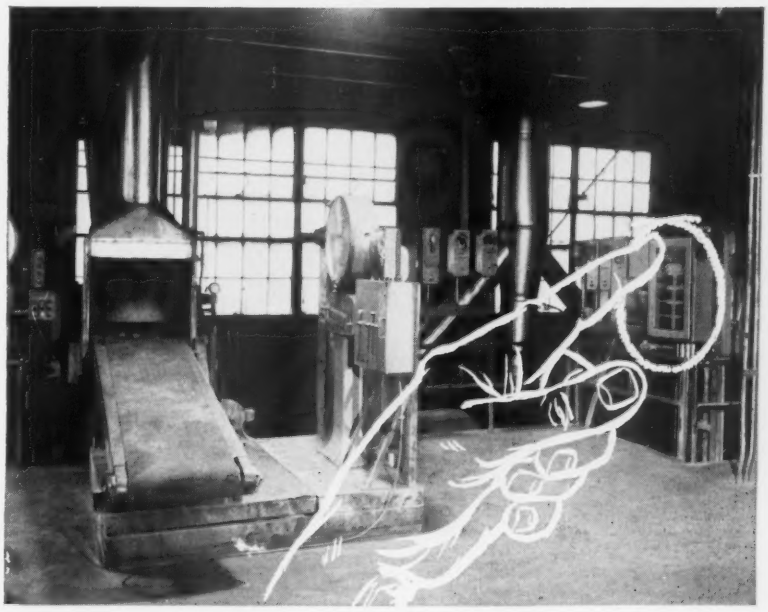

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Latex Foam Discussed At NAFM Convention

► The case for latex foam was presented at the cushioning session of the 1960 convention of the National Association of Furniture Manufacturers on August 27 at the Conrad Hilton Hotel in Chicago, Ill. Representing the latex foam industry at the cushioning session were: Edward Welch (RMA); Anselm Talalay (Goodrich); and D. K. Usher (Goodyear). The speakers reviewed the history of the latex foam industry, discussed the development of an industry-wide public relations program, and described the possible future role of latex foam in the furniture field.

Mr. Talalay remarked that one of the basic recent advances in foam rubber was the introduction of the so-called pincore block. He pointed out that pincore can quickly and economically be cut to any desired shape right in the furniture factory without exposing cores of objectionable size or can be sliced to any thickness without exposing apertures in excess of what can be tolerated even under the flimsiest of upholstery fabrics. In addition, he said, no costly special molds are necessary and no large cushion inventories need be maintained.

Urethane Opportunities

Mr. Usher, in discussing where urethane fits into the cushioning picture, remarked that it has many of the same opportunities that latex had in 1946. He explained that urethane's greatest enemy at this time is its low price, i.e., cost selling price relationship. According to the speaker, this position could force producers to substitute inferior materials, result in failures, and give all foams a black eye.

Mr. Welch discussed the public relations and publicity program for latex foam rubber. He told the group about a motion picture film on the latex industry, which was planned and developed in cooperation with the National Association of Manufacturers. He pointed out that this film is appearing on the NAM television series "Industry On Parade," and will be seen over some 272 television stations in the United States. He explained that this film program is aimed only at the public and at educating it to the benefits that can be derived from the quality and versatility of latex foam rubber.

H. O. Holland, Jr.

Receives SRG Scholarship

► **Hugh O. Holland, Jr., has been named by the Southern Rubber Group as the fourth recipient of its Harmon Connell Memorial Scholarship. Mr. Holland, a native of Louisville, Miss., will be a senior at Mississippi State University during the 1960-1961 school year. The Harmon Connell Memorial Scholarship was established by the Southern Rubber Group at Mississippi State University to honor the memory of Harmon Connell, who was the first chairman of the group and a graduate of Mississippi State University.**

U.S.I. Promotions Told

► William F. McDonald has been promoted to the post of manager, customer services, and Gerald M. Platz, manager, plant services, for the U. S. Industrial Chemicals Co., New York, N. Y. Both men were formerly assistant polymer service laboratory managers. Mr. McDonald joined the company in 1952 as a chemist in the technology laboratory located at Tuscola, Ill. He became product control supervisor in the polyethylene research and development laboratory when the company began production of Petrothene polyethylene at Tuscola in 1955. In 1957, he became group leader, physical testing and control. He was promoted to assistant polymer service laboratory manager in 1958. Mr. Platz joined U.S.I. in 1959 as assistant polymer service laboratory manager over the Quality Control, Special Developments, Pilot Plant and Plant Assistance Groups.

Rubber Safety Section Meeting in Chicago

► The Rubber Section of the National Safety Council will meet on October 17 and 18 at the Conrad Hilton Hotel in Chicago, Ill., during the 1960 National Safety Congress and Exhibition, which will run from October 17 to 21. General chairman for the two-day program will be W. J. Dooling (Goodrich Footwear and Flooring).

The program for the first day of the meeting consists of the presentation of three talks: "Management Backing for Safety," by H. L. Ginnavan (Goodyear); "Behavior Tendencies in Injury Repeaters," by Thomas N. Jenkins (Psychological Services, Executive Analysis Corp.); and "The Responsibility of a Medical Director in the Rubber Industry," by Dr. W. A. McCausland (Goodrich Footwear and Flooring).

A luncheon will precede the second day's meeting, with R. A. Manning (Goodyear) serving as toastmaster. Guest speaker at the luncheon will be H. W. Boettner (Firestone), who will talk on "The Power of Positive Safety."

The program for the final meeting consists of a talk on "Large Fires in the Rubber Industry," by E. Jefferson (U.S. Rubber), and a symposium on "Getting the Safety Message Across." The panel includes: *Moderator*, L. W. Boulton (Polymer Corp., Ltd., Canada); *To the Employee*, E. C. Shedd (U. S. Rubber); *To Management*, C. E. Beck (St. Clair Rubber); *To the Public*, M. R. Batche (Firestone); and *Media*, S. A. Wright (Inland Mfg.).

Develops Surface Finish

► Adply-A, a new surface finish that is said by its producer to provide up to twice the adhesion with excellent corrosion resistance, has been developed for high-carbon steel wire used in reinforcing rubber goods by National-Standard Co., Niles, Mich. High-carbon steel wire with Adply-A finish is available from 0.012 to 0.050 inch in diameter. Adply-A finish wire is recommended by the company for high-pressure hose applications where the cost of brass-plated stainless is prohibitive but where liquor finish wire will not provide adequate corrosion protection. Initial applications have been in reinforcing wire in bilge hose for nuclear submarines and bead wire for aircraft tires.

New DuPont Process For Urethane Foam

► A new technique for the making of urethane foam, described as a frothing process, has been developed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The company claims that the new development should broaden the urethane foam market, particularly for the so-called rigid types. According to the company, the new process will be made available to customers for its Hylene organic isocyanates, basic raw materials for urethane foams.

Compared to conventional methods, the frothing process is said to permit greater uniformity of the final product, cutting down on collapse, voids, uneven sections and other troublesome problems for producers of the plastic foam. With the new DuPont technique, Freon blowing agents or tiny air bubbles are introduced under pressure into the liquid mixture of foam ingredients. Ordinarily the foam mixture expands 30 to 40 times to reach final volume. By expanding the mixture before the start of chemical reactions, which jells the foam, the froth process reduces final expansion to only three- to six-fold, enhancing final quality, the company states.

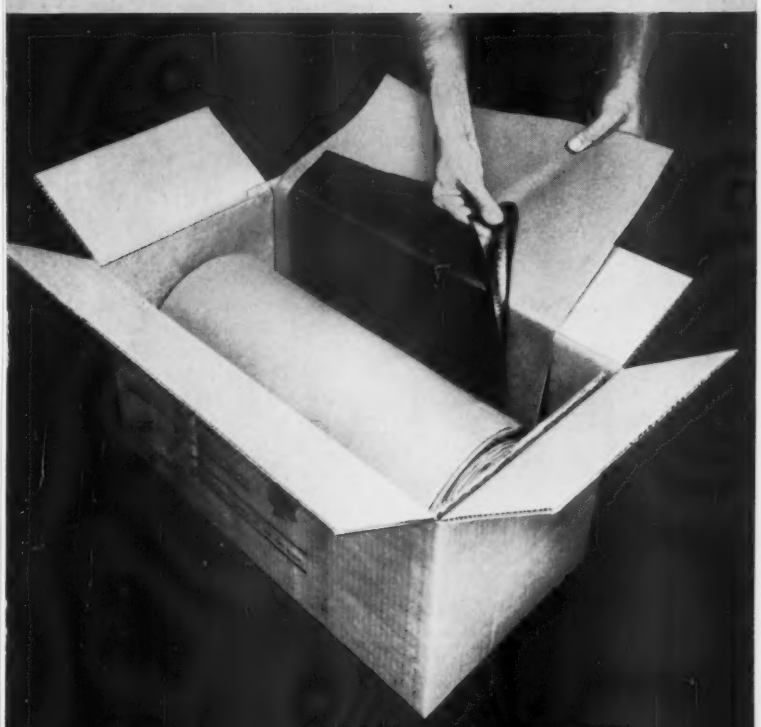
New Frothing Process

The new frothing process, DuPont claims, is especially adaptable to producing rigid, foam-in-place thin sections for applications such as refrigerator walls, building panels or other insulation. In addition, the new technique also promises improved quality for so-called resilient urethane products turned out in molds, such as seat cushions. The company reports that the new process is not expected to have any immediate impact on the production of slab foam, from which many final products are fabricated.

A DuPont spokesman estimates that the total urethane foam market this year will be around 100 million pounds, with rigid foam occupying only 15 per cent of that market. The spokesman ventures that DuPont's new development could boost the rigid foam market to 100 million pounds within five years' time, with a total estimated urethane foam market of about 300 million pounds at that time.

An index to Volume 87 of RUBBER AGE will be found on pages 183 to 186 of this issue.

2 useful services...



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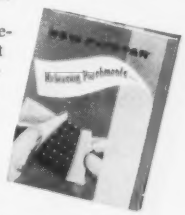

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Wire and Cable Group Schedules 25 Papers

► Twenty-five papers will be presented in five technical sessions during the Ninth Annual Wire and Cable Symposium to be held from November 30 to December 2 at the Berkeley-Carteret Hotel in Asbury Park, N. J. The symposium is jointly sponsored by the U. S. Army Signal Research and Development Laboratory (USASRDL) and industry. Howard F. X. Kingsley (USASRDL) will be general chairman of the three-day meeting, and Fred W. Wills, also of the Laboratory, will serve as co-chairman.

The papers to be presented will show the technical progress during the preceding year in the field of communication wires and cables. Col. H. McD. Brown, commanding officer of USASRDL, will give a welcoming address at the start of the first technical session. The technical program follows:

November 30, 9:30 a.m., Chairman, S. Montgomery, Jr. (Montgomery Co.): "A Present and Future View of the Field Army Wire and Cable Requirements," by Major D. T. Patterson (U.S. Army Signal Corps School); "Four Wire Field Wire," by L. C. Platau and R. H. Cranmer (USASRDL); "Developments in Miniature 300-600 Volt Flexible Insulated Lead Wires for use at 700° to 2000°F.," by W. D. Parker (Rockbestos Wire & Cable); "The Power Rating of Teflon Coaxial Cables at Extreme Environments," by E. T. Pfund, Jr. (Electronic Specialty Co.) and P. S. Klasky (United Electrodynamics, Inc.).

November 30, 2:00 p.m., Chairman, C. T. Wyman (Bell Telephone Laboratories): "The Influence of Extruder Flow Path Geometry in the Production of Homogeneous Cellular Plastic Insulation," by E. D. Katz, E. O. Bauer and P. E. Fox (Bell Telephone Laboratories); "Polymer Requirements and Insulation Techniques for High Density Polyethylene," by R. J. Ettinger (Goodrich-Gulf); "Wire Jackets of Nylon: Reliability-k (Extrusion Conditions)^{N} (Polymer Quality)," by E. C. McKannan and R. E. Shaw (DuPont); "Simultaneous Extrusion of Polyethylene and Polyvinyl Chloride Coatings on Electrical Conductors," by G. E. Henning (Western Electric); "An Adapter to Improve the Sensitivity of the Q Meter for Dielectric Loss Measurements of Polyethylene," by L. Rosenthal and T. Hazen (Union Carbide Plastics); "An Improved Oven for Accelerated Aging of Polyvinyl Chloride Insulation," by R. M. Sherwood and S. J. Boronski (Monsanto Chemical).

December 1, 9:15 a.m., Chairman, H. L. Wuerth (Goodrich Chemical): "Coax Cable and Shielded Wire Terminations," by M. W. Brown (AMP, Inc.); "Silicone Compound Development and Quality Control Through Use of the Mooney Viscometer," by R. M. Savage (G-E); "Degradation of Polymers by External Corona Discharge," by R. F. Grossman (Anaconda Wire & Cable); "Heat Aging Studies of Chemically Cross-Linked Polyethylene," by A. E. Tarbox (Union Carbide Plastics).

December 1, 2:00 p.m., Chairman, R. P. Houlihan (Gavitt Wire & Cable): "High Density Polyethylene Insulation in Communication Cables," by J. V. McBride (Plastic Wire & Cable); "New Low-Loss Balloon Type Polyethylene Insulation for Telecommunications Cables," by G. Fuchs and P. Verges (Societe Anonyme de Telecommunications, France); "Construction Details and Processing Methods of Geophysical Cables," by C. P. McKenna (Vector Mfg.); "A New Non-Twisting Armored Submarine Cable," by G. Palandri, P. G. Priaroggia and R. Monelli (Pirelli, S.p.A., Italy); "Unarmored Submarine Cable for Deep-Sea Carrier Telephony," by A. L. Meyers (Submarine Cables, Ltd., England); "Cable Splicing Utilizing New Silicone Materials," by R. E. Kincaid (Dow Corning).

December 2, 9:15 a.m., Chairman, I. T. Stoneback (ITT Laboratories): "New Fluorocarbon Insulation Compounds," by W. L. Gore (W. L. Gore & Associates); "Recent Studies of Mineral Fillers in Butyl Rubber and Other Insulation Materials," by W. F. Fischer (Enjay); "The Irradiation Induced Elastic Memory of Polymers," by V. L. Lanza and P. M. Cook (Raychem Corp.); "The Application of Electrical Cable to Missile Systems," by G. M. Morgan (Douglas Aircraft); "Production by Autogeneous Extrusion," by A. N. Gray (Consultant).

New RTV Curing Agents

► The preparation of RTV (room temperature vulcanizing) silicone is said to have been improved and simplified with the introduction of three new paste-type curing agents by the Silicone Products Division of the General Electric Co., Waterford, N. J. The new paste curing agents, RTV-992, -993, and -994, simplify and improve the processing of RTV compounds in several ways. By diluting the liquid curing agent into a paste, a greater quantity is required to effect a cure. As a result, it is much easier to accurately weigh and measure the catalyst.

Moreover, the addition of color to the paste curing agents, in contrast with the color of RTV compounds, helps assure thorough mixing and complete dispersion. The three available types of curing agents are said to offer the user a broad range of curing conditions to meet specific application requirements. Depending upon the percentage of curing agent used and particular RTV compound required, pot life and tack-free-time can be controlled from 15 to 30 minutes respectively to several days.

Cyanamid Names Two

► John M. Fasoli and R. W. Daniels have been appointed manager of commercial operations and manager of services, respectively, for the Organic Chemicals Division of American Cyanamid Co., Bound Brook, N. J. Mr. Fasoli will be responsible for coordinating activities of the division's Commercial Development Department and the six commercial departments. Mr. Daniels will have responsibility for coordinating all activities of the division's Purchasing, Legal, Public Relations, Traffic, Personnel Services and General Services Departments.

Mr. Fasoli, a lawyer, joined Cyanamid in 1946 and was assigned to the Organic Chemicals Division, with responsibility for the company's legal affairs in New Jersey. Since 1958 he has been manager of services for the division, the post now occupied by Mr. Daniels.

Mr. Daniels, a chemist, has been associated with Cyanamid since 1936, holding a variety of sales posts. He has been assistant director of sales for the Organic Chemicals Division for the past three years.

New High in 1959 For Plasticizers

► According to preliminary figures released by the U. S. Tariff Commission, plasticizer output in the United States hit an all-time high of 524 million pounds in 1959, a 25.4 per cent increase over the 418 million pounds produced in 1958. Plasticizer sales in 1959 amounted to 462 million pounds valued at $138 million, also a record, compared to 1958 sales of 356 million pounds valued at $111 million.

A breakdown of the Tariff Commission figures reveals that cyclic plasticizer production rose 84 million pounds over 1958 to 396 million pounds, with sales totaling 355 million pounds, valued at $97 million. A sales value of $76 million was reached in 1958 for 265 million pounds. Accounting for the biggest volume of cyclic plasticizers were the phthalic anhydride and phosphoric acid esters and complex polymeric-type materials. The largest output for any single type of plasticizer was the 147 million pounds of dioctyl phthalates produced in 1959.

The output of acyclic plasticizers in 1959 increased by 20.8 per cent to 128 million pounds, compared with 106 million pounds produced in 1958. Sales of acyclic plasticizers, which include esters of adipic, azelaic, oleic, phosphoric, sebacic, and stearic acids, totaled 107 million pounds, compared with 91 million pounds in the previous year. Dollar value of the 1959 sales amounted to $41 million, a $6 million rise over the $35 million sales value in 1958.

New Nopco Thickener

► A new thickener, Modicol VI, intended for natural and synthetic latices used in coating and adhesive applications, has been announced by Nopco Chemical Co., Newark, N.J. It is a modified ammonium polyacrylate which, according to the company, has excellent color and clarity, provides high viscosities at low concentrates, is free flowing and easy to handle, and does not yellow or embrittle. When used in latex paint it thickens the formula, aiding in pigment suspension, making the paint easier to brush on. In latex adhesive preparations and dip coating applications it is said to thicken the formula and give good film-foaming chacteristics, also improving the storage stability of the adhesive and minimizing the danger of coagulation under mechanical stress.

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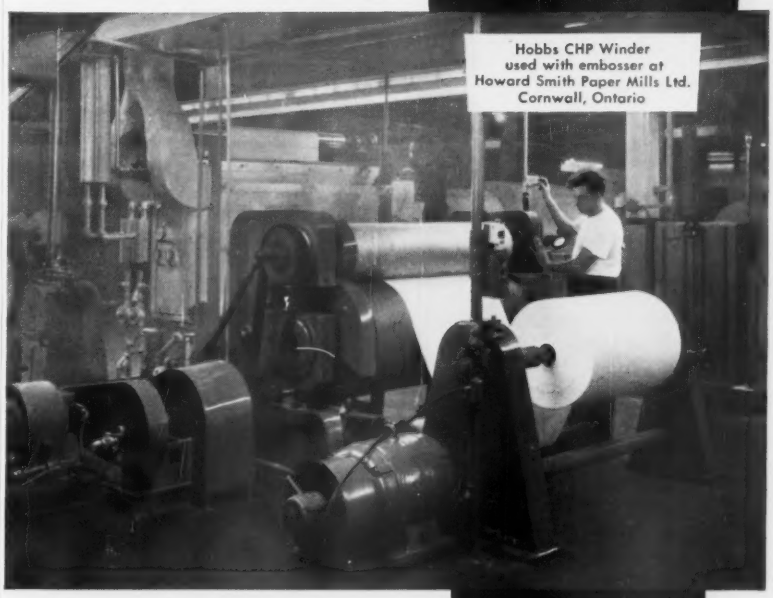

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Enjay Escon Grades

► The Enjay Chemical Co., New York, N. Y., has made available data on its three grades of general purpose injection-molding polypropylene. Escon polypropylene went into production in May when the company opened its new 40 million pound per year polyolefin plant at Baytown, Texas. (RUBBER AGE, June 1960). Escon grades 103, 104 and 105 vary only in flow properties, affording the following melt indices: Escon grade 103, 1.5; grade 104, 3.5; and grade 105, 5.5. Grade 103 is low flow, low flash for high-speed operations at high pressures and temperatures for small precision molded parts. Grade 104 is intermediate flow, and, according to the company, has excellent processability for most high-speed molding operations at conventional pressures and temperatures. Grade 105 has high flow for rapid filling of intricate molds under high-speed conditions. The company reports that temperatures from 400° F. to as high as a melt temperature of 525° F. can be employed for these resins, and that all three grades remain stable under long-term service conditions at high temperatures.

Suntide to Build Plant

► Suntide Refining Co., a wholly-owned subsidiary of Sunray Mid-Continent Oil Co., Tulsa, Okla., will build a styrene plant with a 60 million pound per year capacity in Corpus Christi, Texas. Construction will start about November 1, and styrene is expected to be in production in the Spring of 1962. The plant will be built for expansion to a 75 million pound capacity. The report on the construction of the plant was the third announcement of capital expenditure in the petrochemical field in recent months by the subsidiary. The expenditures, totaling about $10 million over a two-and-a-half year period, will also cover a benzene extraction unit at the DX Sunray refinery in Tulsa.

Buys California Rubber

► The Connecticut Hard Rubber Co., New Haven, Conn., has completed arrangements to buy the assets of California Rubber Products, Inc., Torrance, Calif., for an undisclosed amount. The California producer of ducts for the aircraft industry will be operated as a separate division of Connecticut Hard Rubber Co. Present management will be retained.

R. A. Hagberg

Joins Capital City

► Ralph A. Hagberg has joined the Capital City Products Co., Columbus, Ohio, as sales manager of the Fatty Acid Division. The author of a number of articles on vegetable oil refining, Mr. Hagberg has over 20 years of experience in the chemical industry, including research, marketing, technical service, and sales experience in oils, fats, fatty acids and their derivatives. He has sold directly for manufacturers, and also has served as a manufacturers' representative.

German Conference Set

► The 9th German Synthetics Conference will be held April 12-14, 1961 in the Kongresshalle, Berlin, and plans for the meeting, sponsored by the technical-scientific and economic professional societies of the West German plastics field, are being made. Each day there will be a morning plenary session with two lectures in the fields of physics, chemistry and technology of synthetics, the economics of synthetics, and their applications. Each afternoon there will be two discussion sessions, held simultaneously. The program will include a social evening, tours of East and West Berlin, and special events for the wives of participants. The American Express Co. will handle travel and hotel arrangements.

Kuethe Heads Wilkinson

► W. L. Kuethe has been elected president of the Wilkinson Co., Akron, Ohio, succeeding W. B. Early who has become chairman of the board. The company manufactures industrial conveyors and handling equipment.

T. R. Evans

Dunlop Appoints Evans

► Thomas R. Evans has been appointed development representative of the International Purchasing Service of the Material Supply Division, Dunlop Rubber Co., Ltd., London, England. He will have his offices at the Dunlop Research Centre, Toronto, Ontario, Canada. Mr. Evans will be concerned with developments on the North American continent and will work closely with the Toronto Research Centre and the Purchasing Departments of the Dunlop manufacturing companies in Toronto, Ontario, and Buffalo, N. Y.

He is a 1948 graduate of the University of Wales, and he received honors in chemistry there in 1949. Mr. Evans spent five years with Dunlop's General Development Division in Birmingham, England, where he was active in research and development on synthetic polymers. During the past six years he was technical advisor to the company's Material Supply Division in London.

Jefferson Names Head

► John D. McPherson has been elected president and a director of Jefferson Chemical Co., Inc., Houston, Texas, succeeding George R. Bryant, who has retired. Mr. McPherson graduated from Auburn University with a B.S. degree in chemistry, and received an M.S. degree in biochemistry from Emory University. During World War II, he was chief, Production Division, U. S. Army Chemical Center, Edgewood, Md. He joined American Cyanamid Co. in 1945, where he was manager, Manufacturers' Chemicals Department, prior to joining Jefferson. He joined Jefferson in 1955 as vice-president, operations, and in 1958, was elected executive vice-president.

Black Consumption Rises

► Sales of carbon black climbed 21 per cent last year, with the rubber industry increasing its requirements by 23 per cent. The industry consumed 1.46 billion pounds out of last year's total sales of 2 billion pounds. Total output of carbon black in this country jumped 20 per cent in 1959, and earlier this year trade sources were predicting a continued climb in demand and capacity. Latest estimates were of a 3 to 4 per cent increase this year. Meanwhile, stocks are dwindling and demand for a greater capacity has been indicated. Continental Carbon has been adding another 25 million pounds per year to the capacity of its plant at Westlake, La. Phillips Chemical plans to construct a 60 million pound per year plant near Orange, Texas, and completion has been scheduled for the third quarter of this year. Columbian Carbon has also started a modernization and expansion program.

In the 1959 increase, furnace black production was up 25 per cent, although channel black production dropped 1 per cent. According to the U. S. Bureau of Mines, 41 carbon black plants were active last year, and several increased their capacity. Total operating capacity increased by 128,400 pounds per day, to more than 5.76 million pounds per day.

Named by Goodrich

► James F. Whiting has been named sales representative for Hycar special purpose rubber by B. F. Goodrich Chemical Co., Cleveland, Ohio, and will make his headquarters in New York City, serving the city area as well as part of Connecticut and western Massachusetts. A 1956 graduate of Northeastern University with a B.S. degree in chemical engineering, Mr. Whiting joined the B. F. Goodrich Co. upon graduating. First assigned to the works technical group at the Akron main plant, he was then transferred to Goodrich Chemical as a junior technical man in the process development group at the firm's Akron chemical plant. He then served with the Army Chemical Center in Maryland, rejoining Goodrich Chemical in 1958 as a junior technical man at the firm's development center at Avon Lake, Ohio. In 1959 he was promoted to the post of technical man, moved up to the position of product engineer, and transferred to the Hycar technical service group at Goodrich Chemical's main office in Cleveland.

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Fort Wayne Holds Annual Golf Outing

► Over 370 members and guests attended the Ninth Annual Golf Outing of the Fort Wayne Rubber and Plastics Group, on June 10 at the Tippecanoe Country Club in Leesburg, Ind. In addition to golf, the day's activities included horseshoes, baseball and cards. Stan Shaw (Witco) served as chairman of the golf outing, and members of his committee were: John Porter (H. Muehlstein), Joe Ross (O'Connor & Co.), Jack Lippincott (Dryden Rubber), Jerry Zwick (Goodyear), Ed Theall (Dryden Rubber), Pat Tully (Industrial Rubber Goods), Ed Bosworth (Columbian Carbon), B. Hutchinson (Copolymer Rubber & Chemical), M. J. O'Connor (O'Connor & Co.), Bob Kanthak (Schacht Rubber), Charles Collins (General Tire), A. Robinson (Harwick Standard), Al Cobbe (Godfrey L. Cabot), and Mel Whitefield (Naugatuck Chemical).

Golf prizes and first place trophies were won by the following: *Low Gross, first,* Don Zimmerman (U. S. Rubber), *second,* Wayne Place (Jasper Rubber); *Longest Drive, first,* Richard Rieger (Union Carbide Plastics), *second,* Richard Wilson (General Tire); *Closest to Pin, first,* Robert Shewchek (General Tire), *second,* R. J. Kerr (Interchemical); *Fewest Putts, first,* John Lawless (DuPont), *second,* Al Greenwald, (General Tire), *third,* Wayne Place (Jasper Rubber); *Blind Bogey, first,* F. Westergan (guest), *second,* Harry Kushnarov (General Tire), *third,* Harry Hagmeier (Owen-Corning Fiberglas), *fourth,* Wayne Place (Jasper Rubber), *fifth,* William Johnson (Goshen Rubber).

Under the Peoria System, the following members and guests were awarded gold prizes: *first,* with a score of 63, R. Gilligan (guest); *second,* with a 63, Vincent Bartelmo (Naugatuck Chemical); *third,* with a 64, Gordon Rice (South Haven Rubber); *fourth,* with a 64, William Pittman (Mogul Rubber); *fifth,* with a 65, Roy Marston (Columbian Carbon); *sixth,* with a 65, R. Carr (guest); *seventh,* with a 66, R. Walker (guest); *eighth,* with a 66, Harold George (American Synthetic Rubber); *ninth,* with a 66, D. Koch (Dayco); *tenth,* with a 66, Leroy Bakehorn (General Tire); *eleventh,* with a 67, Harry Hubbs (Union Carbide); *twelfth,* with a 67, Robert Riel (Industrial Rubber Goods); *thirteenth,* with a 67, R. Gillespie (guest); *fourteenth,* with a 67, William Pensler (guest); and *fifteenth,* with a 67, William Ford (Columbian Carbon).

Sturtevant Names Agent

► J. D. Robertson, Inc., Atlanta, Ga., has been named Southeastern representative of Sturtevant Mill Company, Boston, Mass. The company will represent Sturtevant in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, and Virginia.

Southern Ohio Group Sponsoring Lectures

► The Southern Ohio Rubber Group is sponsoring a lecture series at Sinclair College, Dayton, Ohio, on the subject, "Introduction to the Technology of Elastomeric Materials." The series will be held during the Fall semester at the college, commencing in the latter part of September, and will run for 16 weeks. The text for the series will be "Introduction to Rubber Technology," which has been edited by Dr. Maurice Morton, director of the Institute of Rubber Research at the University of Akron. Lecturers for the course will be members of the Southern Ohio Rubber Group. Two hours of college credit will be given to those who complete the series.

Promoted by Witco

► Allen B. Craig has been promoted to the post of assistant sales manager of the Rubber Chemicals Division of Witco Chemical Company, New York, N. Y. He will have his headquarters in Houston, Texas, and will be responsible for the sale of Witco-Continental carbon black in the South and Southwest. A graduate of Lafayette College with a B.S. in Chemical Engineering, Mr. Craig joined Witco in 1946 and was Southwestern district sales manager of the Organic Chemicals Division before assuming his new post.

Mastic Shifts Production

► Mastic Tile Division of the Ruberoid Co., Vails Gate, N. Y., has discontinued the manufacture of rubber floor tile under the Mastic and Wright brands. According to Seymour Milstein, president of the Division, mounting demands for the company's solid vinyl tiles have made it necessary to shift facilities formerly used for the manufacture of rubber to the production of solid vinyl. Mr. Milstein also cited a market trend away from rubber tile to solid vinyls as a reason for the change.

Rapid Roller Appointment

► A. M. Wightman has been appointed technical director of Rapid Roller Co., Chicago, Ill. He is a graduate of Purdue University School of Engineering, and has been associated with the Dayton Rubber Co. and the B. F. Goodrich Chemical Co.

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Donald Swindells

Davis-Standard Appointee

► Donald Swindells has been named sales engineer for the Midwest and Southwest states for Davis-Standard, Mystic, Conn., and he will service wire and cable insulating accounts and in addition handle general plastics extrusion business in the South Central and Southwest areas. Mr. Swindells has a B.S. degree in engineering from Brown University and an M.A. in business administration from Northeastern University. He has worked as a project engineer for both Simplex Wire and Cable Co., Cambridge, Mass., and the Textile Product Development Laboratory of Owens-Corning Fiberglas, Toledo, Ohio.

Allied Slates Expansion

► In line with a recent statement by Chester M. Brown, president of Allied Chemical Corp., New York, N. Y., that accelerated expansion of research and new plants in the 1960's will exceed the $700 million capital expenditures made by the company in the last decade, comes the news that a major research expansion will more than double the laboratory facilities of the company's General Chemical Division near Morristown, N. J. Mr. Brown told the building and paving sales force of the Barrett Division that the company will increase its participation in the major fields of construction, synthetic fibers, plastics and chemicals for agriculture.

The Morristown expansion is another step in Allied's long range development of its Morristown center, and will provide for stepped-up research on fluorine polymers, thermally stable fluids, and refractory metals, along with consolidation of technical services and petrochemical research groups. The plant is to be completed towards the end of 1961.

Promoted by Goodrich

► Frank E. Bell and Doran E. Sauser have been promoted to the recently created position of area marketing representative by B. F. Goodrich Chemical Co., Cleveland, Ohio. The two men were Hycar rubber materials sales representatives. As area marketing representatives, they will continue to have responsibility in field sales, including development of new markets and new applications for the firm's line of synthetic rubber materials. In addition to continuing to assist customers in solving technical problems, they will have added responsibility in sales office management in their respective areas.

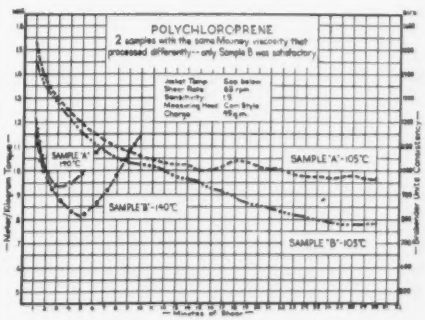
Mr. Bell, a graduate of Case Institute of Technology with a B. S. degree in chemical engineering, joined the firm in 1944 and is assigned to the Cleveland sales office. Mr. Sauser, who joined the firm in 1937, is also a chemical engineering graduate of Case Institute. He is located in the company's New York sales office. Both men had technical positions with Goodrich Chemical before entering the sales area.

Named by Modern Plastic

► Four new appointments have been announced by Modern Plastic Machinery Corp., Clifton, N. J. Frederick J. Maywald, Leslie J. Kovach, Bruno V. Menegus, and Casper S. Gilbert have been named, respectively, vice-president and general manager, vice-president in charge of blow molding, chief engineer, and sales manager.

Mr. Maywald, who has had more than twenty years engineering and managerial experience in the rubber, chemical and plastics industries, has been associated with National Rubber Machinery Corp., National Hygienic Products Co., Duratex Corp., Allied Latex Corp., Tecla Chemical Co., and Standard Latex Co. Mr. Kovach was previously president of Boston Plastic Machinery, Inc., and has also been associated with Foster Grant Co., Inc., where he was chief industrial and development engineer.

Mr. Menegus is a graduate of Fairleigh Dickinson University with a B.S. in physics, and Mr. Gilbert has been associated with the company in executive sales positions for the past two-and-a-half years.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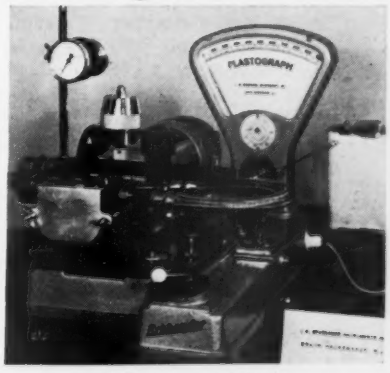

Various measuring heads for all types of material

Names in the News

Robert E. Davies, project engineer, passenger tire development, for B. F. Goodrich Tire Co. since 1957, has been named technical manager, molded goods for B. F. Goodrich Industrial Products Co., Akron, Ohio.

M. R. Poston, formerly assistant secretary, has been elected secretary and assistant general counsel of American Enka Corp., New York, N. Y.

Sidney Friedman, partner in the law firm of Cole, Grimes, Friedman and Deitz, has been elected to the board of directors of Acme-Hamilton Manufacturing Corp., New York, N. Y., and **James V. Carlin, Jr.** has been appointed vice-president of sales.

A. M. Flasco has been promoted to the post of coordinator of all Western hemisphere operations of the General Tire & Rubber Co., Akron, Ohio.

L. E. Gressingh, formerly technical superintendent of the company's Mogadore chemical plant, has been appointed a staff engineer in the Chemical Division of the General Tire & Rubber Co., Akron, Ohio, and has been succeeded in his former post by **Richard S. Novitsky.**

Phillip Mackler has been transferred to the West Coast as a technical sales representative for the Chemical Division of the General Tire & Rubber Co., and will have his headquarters in Los Angeles, covering the West Coast, Texas and Colorado.

Charles Histed, formerly district manager of sales in the Eastern United States, has been appointed sales manager of Stillman Rubber Co., Culver City, Calif.

James L. Musgrove has been appointed Southwestern regional sales manager for Instron Engineering Corp., Canton, Mass., and will have his offices in Houston, Texas.

William Swan, formerly the company's sales representative in Dayton, Ohio, and the surrounding area, has been appointed assistant sales manager of Parker Seal Co., Culver City, Calif.

R. J. Luebbers has been named director of quality control and technical service for the United States and Canadian tire plants of the Firestone Tire & Rubber Co., Akron, Ohio.

Donald C. Hay, formerly section manager of new products development for the B. F. Goodrich Aviation Products Division, has been appointed development engineer in charge of airplane tire compound development for the B. F. Goodrich Tire Co., Akron, Ohio.

Richard Gallmeyer has been appointed a representative for the Parker Seal Co., Cleveland, Ohio, in the Southern Ohio, Southern Indiana, and Kentucky areas, and **William A. Taylor** has been named in the Pittsburgh, Penna., area.

Charles E. Thomas, former associate director of a Greenwich, Conn., marketing research and consulting firm, has been named senior advertising research analyst for the B. F. Goodrich Co., Akron, Ohio.

Marshall A. Williams has been appointed director of marketing of the Simplex Wire & Cable Co., Cambridge, Mass., and will head the activities of the company's newly created Marketing Department.

E. H. Baker has been named general manager of Columbian Continental Europa, S.p.A., a company owned jointly by Columbian Carbon Co., New York, N. Y., and Continental Carbon Co., Houston, Texas, which is presently constructing production facilities at Trecate, Italy.

Parker S. Anderson has been appointed development engineer at the Vulcan plant of Reeves Brothers, Inc., in Buena Vista, Va., and will have responsibility for the development and engineering of the Reeves-Vulcan synthetic rubber coated diaphragm line for controls.

Daniel P. Brennan has been appointed technical service representative in midtown New York City by Oakite Products, Inc., New York, N. Y., succeeding **Edmond Malone** who has been transferred to New Jersey.

Norman G. Duke has been named manager of the product application laboratory at the Avon Lake Development Center of B. F. Goodrich Chemical Co., succeeding **Philip J. Weaver** who has been named manager of administrative services for the Center.

James A. Bailey Jr. has been promoted to assistant manager of the Hose Sales Department of the Goodyear Tire & Rubber Co., and **Donald E. Harrington** has been named to replace him as manager of hydraulic hose sales.

Clinton W. Adams has been appointed section manager in charge of development of tread rubber, retreading, tubes and valves, solid tires, accessories and repair materials for B. F. Goodrich Tire Co., Akron, Ohio.

William D. Trammell has been appointed sales representative for the Western District of the Silicone Products Department of General Electric Co. and will be located in Dallas, Texas.

Frank E. Brewster has been named manager of intermediates at the Silicone Products Department of General Electric, Waterford, N. Y., and will be responsible for all phases of the manufacture of basic silicone gums and compounds.

Hermon Marsden, who formerly served as technical advisor to the Manchester branch of Leesona Corp., has been named British agent for Scott Testers, Inc., Providence, R. I.

Dr. Donald C. MacDonald has been appointed a senior research scientist at the Research Center of U. S. Rubber Co., New York, N. Y., where he is engaged primarily in studying the development of instrumentation used in the measurement of the physical properties of rubber and plastics.

Carl A. Fuller, formerly senior buyer for maintenance equipment and supplies, has been named assistant director of purchases for the Dayco Corporation, Dayton, Ohio.

An index to Volume 87 of RUBBER AGE will be found on pages 183 to 186 of this issue.

Another new development using

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Hard on the outer edge for longer wear; softer on the inner edge for better traction, less noise. The two colors you see in these roller skate wheels show how this manufacturer has used two different Hycar nitrile rubber compounds to serve different needs in the same product.

The outer $^{3}/_{16}$" of each wheel is a phenolic compound made with extra-tough Hycar rubber for better abrasion resistance. The inner portion of the wheel is made from a softer Hycar phenolic compound. The two are inseparably bonded during molding.

In addition to providing extra wear and other advantages, in other applications Hycar also provides excellent resistance to oils, chemicals, and gasoline. It is often the key to improving a product or opening a new market. For more information, write Dept. FB-7, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

PREMIER *for professional skaters, and RENTAL, for rinks that rent out skates — wheels are made using two different Hycar nitrile rubber compounds by Fo-Mac Enterprises, Tulsa. B.F.Goodrich Chemical Company supplies the Hycar nitrile rubber.*

Hycar
Rubber and Latex

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

**See our catalog in Sweet's Product Design File.*

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GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

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B.F.Goodrich Chemical *raw materials*

HYCAR 1000X132

has the highest acrylonitrile content of any nitrile rubber

Solves problems of higher aromatic content created for rubber by newer fuels. Anywhere you need unusually high resistance to fuels and oils, Hycar 1000X132 can be the answer.

Easy processing, too. Despite its high acrylonitrile content, Hycar 1000X132 is easy to process. It is being used for products where building tack is required—like steel mill rolls. A variety of other commercial products utilize Hycar 1000X132. These include: gas lift equipment (because of Hycar's exceptionally low gas diffusion properties); fuel pump seals; gasoline pump parts; aerosol spray gaskets; solvent resistant gloves; and parts exposed to dry cleaning fluids.

More information on Hycar 1000X132 and other Hycar polymers and latices is available. Write Dept. FB-8, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

Hycar
Rubber and Latex

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B.F.Goodrich

GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Anselm Talalay

Named by Goodrich

► Anselm Talalay, developer of the Talalay process for making foam rubber, will become general manager of B. F. Goodrich Sponge Products, Shelton, Conn., effective November 1. He succeeds William R. Todd, co-founder of Sponge Rubber Products Co., who has retired. Mr. Talalay was educated at the Berlin Institute of Technology and at University College, London, before coming to the United States in 1937. He joined Sponge Products as a development chemist in 1941 and become general manager of the company's Texfoam section in 1954. In addition to inventing the Talalay process for making foam rubber, Mr. Talalay holds numerous patents for the manufacture of latex foam.

Wins Plane Tire Patent

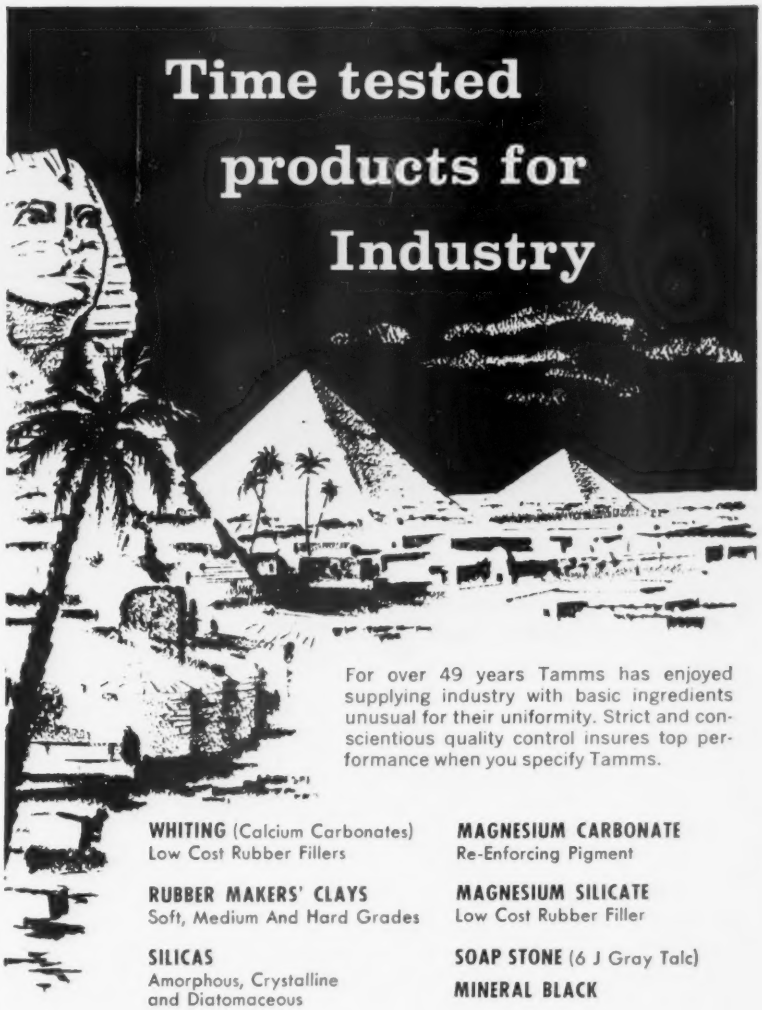
► John O. Antonson, a technical manager of B. F. Goodrich Tire Co., Akron, Ohio, has been awarded a patent on a fabric-reinforced-tread airplane tire that was "too advanced" for the airplanes of a decade ago. The tire, first tested in 1949 when there was no aircraft that needed its extreme high-speed capacity, is in service on many Air Force and commercial jets today. The tire tread is laminated with multiple plies of nylon cord. Thousands of cords, each with a tensile strength of 30 pounds, bind the tread to the tire carcass to keep centrifugal force from stripping the tread off the tire at high speed. Other advantages are reduction of distortion of the tread under load, prevention of excessive heat generation, resistance of tread cutting and punctures, and prevention of the formation of high-speed shock waves.

Columbian Buys Ander

► Columbian Carbon Co., New York, N. Y. has acquired the principal properties and business of Ander Chemical Co., Cincinnati, Ohio, for a sum between $2.5 and $3 million. The acquisition will enable Columbian Carbon to enter the packaging field and expand its printing inks activities. Ander Chemical will become a wholly-owned subsidiary, and George W. Nieder and Carl W. Aneshansel will continue as president and vice-president, respectively, of the subsidiary.

3M Slates Addition

► New and improved production facilities for Kel-F brand chemicals now produced in Jersey City, N. J., will be added to the Minnesota Mining and Manufacturing chemical plant under construction at Decatur, Ala. Kel-F chemicals and fluorochemical Scotchgard brand stain repellers will be the major products of the Decatur plant, in addition to a line of specialty chemicals. The halofluorocarbon line includes plastics, elastomers, dispersion coatings, greases, oils and waxes.



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MINERAL BLACK

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Financial News

Nat'l Vulcanized Fibre

► Six months ended June 30: Net earnings rose slightly to $876,000 or $1.36 per share on 642,215 common shares, as against earnings of $861,000 or $1.39 per share on 617,666 common shares for the first half of 1959. Sales were reported at $13,153,000, an eight per cent gain over sales of $11,937,000 for the comparable period last year. National President Eugene R. Perry said increased costs and an adverse product mix contributed to lower company earnings for the second quarter. Looking ahead to the second half of 1960, Perry said expectations "are for a continuation of volume at a slightly reduced rate."

Sheller Manufacturing

► Six months ended June 30: Net income after taxes climbed to $940,229, equivalent to 99c per share, compared to $869,431, or 91c for the like period a year ago. Consolidated net sales amounted to $26,096,081, as compared with $22,458,196 for the corresponding period of 1959. The quarter profit showed a dip, reflecting, according to the company, the cutback in scheduled automotive production as well as the effect of competition upon profit margins.

Electric Autolite

► Six months ended June 30: Net income amounted to $4,521,266, equal to $3.22 per share, compared to $5,150,288, or $3.30, for the like period of 1959. Net sales rose to $115,756,452 from $99,732,423.

Corduroy Rubber

► For 1959: Net income climbed to $222,397, equal to $9.16 per share, contrasted to $184,370, or $7.05, in 1958. Sales amounted to $6,170,865, compared to $4,767,447 in 1958.

McNeil Machine

► Six months ended June 30: Net income totaled $2,584,539, or $2.07 per share, compared to $1,651,350, or $1.29, for the like period a year ago.

Thiokol Chemical

► Six months ended June 30: Net income fell to $1,736,648, or 38c a share, against $2,868,568, or 64c a share on a slightly lower number of shares, in the first half of last year. Sales were $83,361,675, up from $80,735,952 a year ago. The company looks forward to higher sales and earnings in the second half, but does not expect full year earnings to equal those of last year. According to the company's report, first half results were affected by high costs in the Rocket Division. Sales of the Chemical Division were 27 per cent below those of the 1959 first half, but an increase in the division's sales is predicted for the second half.

Seiberling

► Six months ended June 30: Earnings, as the company recovered from a first-quarter loss, were at $106,592, equal to 3c per common share, compared to $754,953, or $1.13 a year ago. Earnings were at an all-time high for the company in 1959. Net sales were $24,910,052, down 7½ per cent from the first half of 1959, when sales were $26,968,925. President J. P. Seiberling blamed the decline on "extremely competitive conditions" in the replacement tire market.

Anaconda Wire

► Six months ended June 30: Net income was reported at $624,738, or 74c per share, contrasted to $2,101,209, or $2.49, for the comparable period a year ago.

Wyandotte

► Six months ended June 30: The company reported a net income of $2,024,000, equal to $1.24 per share, as compared to $1,995,000, and $1.22, for the like period last year.

Garlock, Inc.

► 26 weeks to June 26: Net income dropped to $780,970, or $1.54, down from the $876,560, or $1.78 a share, reported for the like period a year ago.

Goodyear

► Six months ended June 30: Net income amounted to $37,694,223, equal to $1.13 a share, as compared to $40,646,386, or $1.22 a share, for a 7.2 per cent decline in earnings. However, consolidated net sales rose 7.2 per cent to $815,808,995, from the $812,750,506 volume for the six months ended a year ago. Profits of foreign subsidiaries included in the consolidated net income were $11,194,264 this year, against $9,759,723 in the 1959 period. E. J. Thomas, company chairman, attributed the slump in earnings to the increased cost of natural rubber and to higher wages and improved fringe benefits which are not reflected in prices.

Mohawk Rubber

► Six months ended June 30: Earnings climbed 1.4 per cent to $626,000, equal to $1.27 a share, compared to $617,000, or $1.25 a share for the first half of 1959. Sales rose by 9.3 per cent, to $15,950,000, compared to last year's first half volume of $14,595,000. Henry M. Fawcett, company president, told stockholders that the company had anticipated stiff competition in the replacement tire industry, and added "We prepared in every way possible for the higher costs and lower selling prices encountered by the industry."

Bemis Bro. Bag

► Six months ended June 30: Net income was up to $1,529,526, $2.15 per share, from $1,313,038, or $1.84 per share. Sales were up 4 per cent from the first half last year, and totaled $66,357,068, against $64,069,940. The company is predicting equally favorable results for the second half of the year.

Clevite Corp.

► Six months ended June 30: Net income rose to $3,930,395, equal to $2.05 per share, from $3,396,842, or $1.78 per share, for the like period of 1959. Net sales totaled $51,409,665, as compared to $42,797,140 for the same period a year ago.

General Cable

► Six months ended June 30: Net income totaled $4,602,769, or $1.43 per share, up from $4,108,816, or $1.27, in the same period last year. Gross income rose to $16,486,980, compared to $14,500,480.

P. G. Bratenas

Appointed by Goodrich

► Paul G. Bratenas has been appointed general manager of manufacturing of the B. F. Goodrich Footwear and Flooring Co., Watertown, Mass. Mr. Bratenas joined the Goodrich division, which was then Hood Rubber Co., in 1936 upon his graduation from Tufts College where he majored in chemistry. After service in the U. S. Navy he returned to the company in 1945 and continued in the mixing, batching and compounding departments until 1946 when he was appointed assistant superintendent of these departments. In 1950 he was appointed assistant divisional superintendent of Industrial Products, and he became divisional superintendent in 1953. In 1956 he was appointed general manager of B. F. Goodrich Flooring Co.

Cooke to Match Colors

► A color matching laboratory service developed by Cooke Color and Chemical Co., Hackettstown, N. J., will enable the company to produce exclusive color combinations for use with natural and synthetic rubber, polyethylene, styrene and other plastics. The service will also test quality, uniformity and light fastness for manufacturers. Special attention will be given to products requiring high electrical properties.

Seiberling Snow Tire

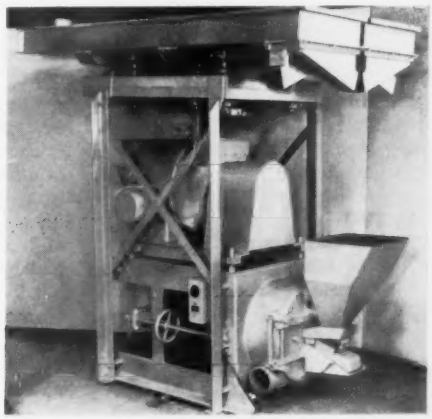
► A Commuter tire, which the company claims offers greatly improved traction in snow and ice conditions, has been developed by Seiberling Rubber Co., Akron, Ohio. The principal change has been in the lug area of the tire, which now has tread slots to afford a greater grip.

AviSun Picks Plant Site

► AviSun Corp., Marcus Hook, Penna., has selected a site in New Castle, Del., for construction of a 100 million pound per year polypropylene plant. The new plant will be adjacent to AviSun's 10 million pound per year film and fiber plants. Polypropylene from the new plant will provide the chief raw material for these plants. AviSun also has an option to purchase facilities at Port Reading, N.J., which could provide an additional 50 million pounds per year of polymer capacity.

To Merge With Simplex

► The stockholders of Simplex Wire and Cable Co., Cambridge, Mass., and Hitemp Wires, Inc., Westbury, L. I., N. Y., have approved the merger of Hitemp with Simplex. The merger, approved by the directors of both companies in August, provides for an exchange of one share of Simplex stock for two shares of Hitemp. Hitemp will operate as the Hitemp Wires Co., a division of Simplex, with George F. Rolfe continuing as president and general manager.



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West Coast News

► Richard L. Wells and L. R. Tate have been appointed to the sales staff of H. M. Royal, Inc., Downey, Calif. Both Mr. Wells and Mr. Tate will be calling on accounts in Los Angeles and the vicinity. Mr. Wells is a 1951 graduate of the University of Southern California and holds a B.S. in industrial management. After graduation he joined the Purchasing Department of the Los Angeles plant of the Firestone Tire and Rubber Co., Akron, Ohio. In 1954 he became a buyer, and in 1956 he was promoted to the post of manager of purchases, a post he held until joining Royal. He is a director of the Los Angeles Rubber Group. Mr. Tate studied business administration at the University of Southern California. He has been in sales positions at California Hardware Co. for the past 12 years.

► The company's first vinyl resin producing plant West of the Mississippi has been officially opened by the B. F. Goodrich Chemical Co., Cleveland, Ohio. Located in Long Beach, Calif., the plant has the capacity to produce "several million pounds of vinyl resins and compounds a year." It is designed to allow for expected expansion. According to Harry B. Warner, president of Goodrich Chemical, "production in the present plant can be increased 50 per cent by the addition of only two major pieces of equipment." The manager of the new plant is P. H. Lawrence, who was formerly manager of a similar plant the company operates in Niagara Falls, N. Y.

► Plastic and Rubber Products Co., Los Angeles, Calif., has occupied new quarters in a 20,000 square foot building next to its existing facilities. The new building, located at 2132 Hyde Park Blvd., now houses the Order, Billing, Inventory Control, Packaging, Receiving and Shipping Departments.

► Richard D. Anderson has been appointed western field manager of industrial sales for B. F. Goodrich Sponge Products, with headquarters at 742 East 60th St., Los Angeles, Calif.

► Gross Manufacturing Co., Monrovia, Calif., has announced that it will continue to manufacture and market its self-vulcanizing Magicure tube and tire repair patch line, now that the company is backed by a Federal District Court ruling against the patent infringement claim of a West German firm.

The recent signing by Judge Harry C. Westover of the dismissal of an appeal from judgment of the U. S. District Court for the Southern District of California closed the two-year-old suit brought unsuccessfully against Gross by Otto Gruber and Co., West Germany, and their United States distributor, Remaco, of New York. Gruber and Remaco had appealed from the 1959 ruling handed down by the late Judge Ben Harrison, of the U. S. District Court for the Southern District of California. Judge Harrison found that the patent in question was invalid.

► Formation of Moore Chemical Corp., specializing in the processing of plastic resins and natural and synthetic rubber, has been announced by Moore Manufacturing Inc., San Francisco, Calif. The new firm has its headquarters at 552 Potrero Ave., San Francisco, and its plant at Whitethorne Way and Kemp Road in Burlingame.

► The Ellay Rubber Co. held a housewarming party in its new office and laboratory on July 7 so that customers and friends could view the facilities and the company's new 72-inch four-roll Inverted L Calender. The company's two such calenders are the only vinyl film calenders west of the Rocky Mountains.

► E. S. Dulin has retired as chairman of the board of Byron Jackson Division of Borg-Warner Corp., in Los Angeles, Calif. He served as president of Byron Jackson from 1929 until 1958 and has been board chairman since 1945. The company became a Borg-Warner Division in 1955.

An index to Volume 87 of RUBBER AGE will be found on pages 183 to 186 of this issue.

► Dr. James D. Calderwood, economist, business consultant, author and lecturer was guest speaker at the dinner meeting of the Culver City Group, held October 4 at the Biltmore Hotel. Dr. Calderwood, who spoke on "Troubled Neighbors: South America in Transition," has just returned from a two month trip throughout Latin and South America.

► H. R. Braley has retired after completing 49 years with the Los Angeles plant of the Goodyear Tire and Rubber Co. Mr. Braley, who was a division superintendent, began his employment with Goodyear at Akron, Ohio, in 1911.

► A Western District office has been established by the Synthetic Rubber Division of Shell Chemical Co. H. R. Nebeker will be Western District manager at the new office, located at 5230 Clark Street, Lakewood, Calif.

► Stillman Rubber Co., Culver City, Calif., and its affiliated companies have become a subsidiary of, and are associated with, the Electrada Corp. The management and operations of Stillman will remain the same.

► Harwick Standard Chemical Co. held an open house on August 2 to celebrate the opening of its new warehouse and offices at 7225 Paramount Blvd., Pico Rivera, Calif.

► Al Federico has been named president of C. P. Hall Co. of California, in Los Angeles, and Jim Modawell has been appointed vice-president in charge of sales.

► John R. Shields, Jr., has been named production manager of the Rialto Rocket Motor Plant of B. F. Goodrich Aviation Products.

Scoville Acquisition

► Scovill Manufacturing Co., Waterbury, Conn., has purchased the assets of International Couplings, Inc., Cleveland, Ohio. The products formerly manufactured by International have been consolidated with Scovill's line of industrial couplings, providing Scovill with a complete line of both permanent and reattachable couplings from ¾-inch to four inches in size for the hose industry and the oil equipment jobber.

Richard A. Riley

Named by Firestone

► Richard A. Riley has been named president of Firestone Rubber and Latex Products Co., Fall River, Mass., succeeding C. J. McCready who has resigned. Mr. Riley is a graduate of Providence College, Providence, R. I., where he received a B.A. degree in 1937. Starting as an accountant at the Fall River plant in 1939, he was named comptroller of the World Bestos Division, then located in Paterson, N. J., in 1942. He moved to New Castle, Ind., in 1945 when the plant operation was transferred to that city. He was appointed assistant general manager of the division in 1955 and became general manager and president in 1956.

Phillips Expands Capacity

► Phillips Chemical Co., Bartlesville, Okla., has announced expansion of its synthetic rubber plants in Borger, Texas, to provide an increase of 5,000 long tons a year in production capacity of its new *Cis*-4 polybutadiene rubber. The expansion is in the form of an addition to a 20,000 ton per year *Cis*-4 plant now under construction. The entire plant is expected to go into full operation this year.

Hatfield Builds Plant

► A new plant, to be devoted to the production of all types of natural and synthetic rubber insulated wire and cable for the electrical industries, is being constructed by the Hatfield Wire & Cable Division of Continental Copper and Steel Industries, Inc., New York, N. Y. The plant, slated for completion in early 1960, is located in Linden, N. J.

Moving Urethane Site

► Dayco Corp., Dayton, Ohio, is moving its urethane foam cushioning production from Marietta, Ohio, to Waynesville, N. C. L. C. Pape, vice-president of the Koolfoam Division of Dayton with headquarters in Asheville, N. C., states that the move had been under study for more than a year. The company has a major plant in Waynesville making foam latex, furniture cushioning, mattresses and pillows plus a variety of products for the industrial and automotive fields. Improved coordination and substantial operating economies will result from consolidation of the latex and urethane foam operations, Mr. Pape states.

Switching to new and improved facilities at Waynesville is also the first step in Dayton's program of urethane expansion, Mr. Pape continues, and the company plans to locate other urethane plants in key market areas for improved customer service. The Marietta plant has been operated as a subsidiary of Dayton since 1951, and employed approximately 115 persons. According to the company some personnel are being transferred and every attempt is being made to help other employees to locate jobs in the Marietta area.

India Issues Plan Draft

► India has issued the draft of an ambitious new five-year plan for 1961-66, which calls for the production of 30,000 tons of synthetic rubber and 3,000 tons of rubber chemicals annually by the year 1965-66. The plan, as a whole, allots a greater share to private investment, allowing $8.4 billion out of a total of $21.4 billion. Privately-owned plants will play a part in the production of rubber chemicals. Several projects included in this, the third plan, are already under way. Firestone is building a synthetic rubber plant. Union Carbide's 60 per cent-owned subsidiary will put its $7.4 million project on stream by the end of the year, producing polyethylene, butyl alcohol, acetic acid and ethyl acetate.

Spadone Names Clark

► Harold H. Clark has been named resident sales engineer in the Akron, Ohio, area for Spadone Machine Co., South Norwalk, Conn. He will be located in Cuyahoga Falls, Ohio. Mr. Clark formerly was manager of machine design for the Goodyear Tire and Rubber Co., Akron, Ohio.

George J. Sella, Jr.

Appointed by Cyanamid

► George J. Sella, Jr. has been appointed sales manager of the Rubber Chemicals Department of American Cyanamid Co., and will have his headquarters in the sales offices of the Organic Chemicals Division, Bound Brook, N. J. A graduate of Princeton University and the Harvard School of Business Administration, Mr. Sella became associated with Cyanamid in 1954 at the company's Bound Brook plant. He served in various capacities in the engineering, process development and production sections until 1956, when he became a sales representative in the Rubber Chemicals Department.

Named by U.S. Rubber

► J. J. Orr has been named director of engineering at U. S. Rubber Co., New York, N. Y., succeeding Carl A. Ostling, who is retiring after 22 years of service with the company. Mr. Orr joined the company in 1931 as an electrical engineer in New York. A year later he was named manager of planning and engineering at the Providence, R. I., plant. In 1937 he returned to the New York office, and in 1938 he was appointed supervisor of electrical engineering. He was named manager of plant engineering in 1943, and assistant director of engineering in 1956.

Dayco Raises Funds

► Dayco Corp., Dayton, Ohio, has raised $2.5 million privately from Equitable Life Assurance Society on 5⅞ per cent notes. Dayco will use the funds for working capital and to reduce bank loans.

Canadian News

► The Tenth Canadian High Polymer Forum, devoted to all aspects of polymer science, was held at the Alpine Inn, Ste. Marguerite, Quebec, from September 7 to 9. It was sponsored by the National Research Council of Canada in co-operation with the Chemical Institute of Canada. In addition to the papers presented, a Forum Banquet was held, and a Forum Lecture was delivered by Professor F. S. Dainton.

Those presenting papers and their topics were: J. P. Berry, "Fracture Processes in Glassy Polymers"; D. I. Livingston, G. S. Yeh, P. Rohall and S. D. Gehman, "Viscoelastic Factors Involved in the Strength of Elastomers Under Complex Stress"; B. Ke and A. W. Sisko, "Differential Thermal Analysis of Polyamides"; M. A. Worthington and W. L. Hawkins, "Novel Thermal Antioxidants Formed by the Interaction of Sulphur Compounds and Synergistic Agents"; W. E. Walles, "Polymolecular Complexes of the Poly Vinyl Oxazolidinones."

P. H. Plesch, "Cationic Polymerization of Isobutene"; R. M. Thomas and J. P. Kennedy, "Studies on the Low Temperature Polymerization of Isobutene"; A. M. Eastham, "The Initiation Step in the Polymerization of Olefins by Friedel-Crafts Catalysts"; S. Bywater, "The Kinetics of Polymerization of Styrene by Butyl Lithium in Benzene Solution"; W. M. Saltman, "A Kinetic Mechanism for the Heterogeneous Stereospecific Polymerization of Propylene."

J. E. Luce and A. A. Robertson, "Sorption of Polymers on Cellulose"; B. E. Conway and M. Lakhanpal, "Thermodynamics of Polyoxypropylene Glycol Solutions"; A. J. Pennings and W. Prins, "A Versatile Osmometer for Polymer Gels and Solutions"; R. H. Marchessault and C. Y. Liang, "The Polarized Infrared Spectra of Xylans"; J. Kratohvil, "Some Properties of Polyvinyl Alcohol in Solution and Interaction with Silver Bromide Sols."

W. Heller, E. Wada and L. Papazian, "Determination of the Shape of Macromolecules from Anisotropic Light Scattering in Flowing Solutions"; R. S. Stein and M. Rhodes, "A Photographic Light Scattering Study of the Stretching of Crystalline Polymers"; W. H. Beattie and J. T. Bailey, "Form and Nomenclature of Averages Obtained in Light Scattering Experiments"; W. Cooper, "Characterization of Polymers and Copolymers of Butadiene"; L. A. McLeod and J. M. Hulme, "Development of an Elution Chromatography Technique for *Cis*-1,4-Polybutadiene."

F. S. Dainton, "The Kinetics of Aqueous Polymerization"; R. J. Ceresa, "Block Copolymerization by Vapor Phase Swelling"; H. Wexler, J. A. Manson and G. J. Arquette, "Some New Polymerizations of Vinyl Monomers"; N. S. Nikolov, "Some Reactions of Polymers with Terminal Carbon-Metal Bonds"; A. J. Havlik, R. F. Landel and J. Moacanin, "The Influence of Urea Groups on the Properties of Diisocyanate-Linked Polyethers."

► A 2½ per cent price increase on passenger car tires has been announced by both the Goodyear Tire and Rubber Co. of Canada, Ltd., New Toronto, Ontario, and the Canadian subsidiary of General Tire and Rubber Co. The General increase, which followed on the heels of the Goodrich announcement, applies to all first and second line tires, and a $1 boost in third line prices and a price adjustment on fourth lines were included. Passenger, farm and truck tire inner tube prices were raised 5 per cent. The company said it raised prices because of a slump in earnings due to severe price competition in Canada, the reason cited by Goodyear in predicting that other companies would follow its example in cutting prices.

The Goodyear Canadian increases run from 50 cents for the least expensive fourth line tire to $1 for the most expensive line. They are the first increases since a downward price trend began three years ago. The current price hike follows recent company price increases on industrial belting and hose of 5 per cent and on truck tires of 10 per cent.

► The XVIIIth International Congress of Pure and Applied Chemistry will be held in Montreal from August 6 to 12, 1961, in connection with the XXIst Conference of the International Union of Pure and Applied Chemistry, to be held August 2 to 5. The program of scientific papers of the Congress will consist of five plenary lectures and approximately fifty invited sectional lectures in addition to the general schedule of contributed papers. The program is divided into four main divisions: physical chemistry, applied chemistry, analytical chemistry, and an organic chemistry symposium. With the exception of the Organic Chemistry Symposium—to consist of invited papers only—several sections of each division will meet concurrently.

► A 40,000 square foot National-Standard Co. plant under construction in Guelph, Ontario, will house the first Metalply spiral plater to be installed in Canada. The patented plater will initially produce copper-plated steel wire for the maker of bead and reinforcing wire for tires, rubber hose, and similar rubber goods. When completed, the $800,000 plant will be approximately 200 by 200 feet with corrugated asbestos walls and face brick.

► B. F. Goodrich Canada Ltd. is negotiating for a 100 acre site for a multi-million dollar tire plant in Kitchener, Ontario. The new plant, part of the company's general expansion program, will manufacture tires only.

Dunlop Spare Available

► A new type of lightweight, compact spare tire assembly has been produced by the Dunlop Tire and Rubber Corp., Buffalo, N.Y. Known as the Dunlop Standby tire, it consists of a steel disc, drilled to match the wheel studs of the car, carrying a narrow-section tubeless tire. The tire is not inflated until it is needed. Then a CO_2 bottle supplied with the unit provides the necessary pressure, or conventional inflating equipment can be used. The unit is less than one inch thick, occupies less space than the conventional spare, and is considerably lighter, according to the company. The tire costs less than the conventional spare. Although it is designed to be used to get the motorist to a place where the damaged tire can be repaired or replaced, the tire can be run for a considerable distance with only a slight difference in the performance of the car.

P. W. Perdriau

Wins Goodrich Promotion

► P. W. Perdriau, general manager of B. F. Goodrich Aviation Products Division since 1956, has been named president of the company's Industrial Products Co., Marietta, Ohio. He joined Goodrich in 1934 immediately after graduation from Harvard University with a B.S. degree in engineering and industrial chemistry. During World War II he served as production manager of fuel cell manufacturing in the Aeronautical Division in Akron, Ohio, and later as manager of fuel cell and de-icer manufacturing at the company's plant in Los Angeles, Calif.

In 1945 Mr. Perdriau was named manager of the company's Los Angeles tire manufacturing plant, and two years later he returned to Akron as superintendent of the Tire Division. He became director of employee relations for the tire company in 1954, the position he held when named to head the Aviation Products Division. He is also chairman of the board of Goodrich-High Voltage Astronautics, Inc., an associate company.

Completes Plant Addition

► Minnesota Rubber Co., Minneapolis, Minn., has announced the completion of a 12,000 square foot addition to its factory. The latest construction, completed on January 1, makes the total manufacturing area approximately 120,000 square feet. Minnesota Rubber reports that the new space will be utilized for the installation of the latest high speed rubber mixing equipment and 12 electric-hydraulic presses.

RMA Gives Tire Reports

► The Technical Advisory Sub-Committee of the Retread and Repair Materials Committee of the Rubber Manufacturers Association recently reported on shoulder separation problems in recapped tires and testing serviceability of retreads. Shoulder separation, the Sub-Committee reports, has become more of a problem in recapping 14-inch tires than it was in 15 and 16-inch tires, as the 14-inch tires show more wear in the shoulder areas, and the contour of the worn tire tread is too round to permit buffing to the normally square shape of modern matrices. The group concludes that round-shouldered tires which must be buffed to a round contour must be corrected by using a greater volume of stock supplied by a "valley-die" size tread rubber, or by the more costly process of using filler on each shoulder.

In discussing the testing of serviceability of retreads, the Sub-Committee warns that although manufacturers have long sought a quick, inexpensive means of rating quality of tire treads by laboratory tests, nothing has ever been found to replace service testing. Though useful in evaluations of raw materials and manufacturing control, laboratory results are not intended for use in serviceability evaluations, and can lead to errors in rating serviceability. A continuous road testing program can, however, provide the retreader with a reliable criterion.

New Simplex Building

► Simplex Wire and Cable Co., Cambridge, Mass., has started a modernization and expansion program. The first phase of the long range plan involves an expenditure of about $3 million and will provide a new 100,000 square foot manufacturing building adjacent to the company's new high voltage electrical testing laboratory now nearing completion.

Allied to Build Plant

► Allied Chemical Corp., New York, N. Y., has announced plans to build a 20 million pound per year capacity polyether plant. Production will start in the middle of 1961. Construction of the plant is the second expansion in the urethane field announced by the company. Increased production capacity of isocyanates was recently announced.

Joseph W. Greenan

In New Firestone Post

► Joseph W. Greenan has been appointed general manager of World Bestos Corp., New Castle, Ind., a division of the Firestone Tire and Rubber Co., succeeding Richard A. Riley who has been named president of another Firestone division. Mr. Greenan attended Purdue University, where he majored in electrical engineering, and joined Firestone in 1951 as a sales representative. He was named sales operating assistant in 1955 and became sales manager of World Bestos in 1956.

Inland Rubber Charged

► Inland Rubber Co., Mansfield, Ohio, has been charged by the Federal Trade Commission with giving rebates to favored customers on some of its products, including automobile tires. The complaint included charges that, since 1958, Inland "has charged some customers net prices up to 18 per cent higher than those charged favored customers." Before 1958, the commission said, Inland granted price rebates ranging from 2 to 10 per cent on tube and tire repair products, depending on the volume of sales a year to a given customer. The company was given 30 days to answer the complaint.

Hershberg Changes Name

► Hershberg Rubber Products Co., Ashtabula, Ohio, has changed its corporate name to Ashtabula Rubber Co. A new trademark, ARC, incorporating an arc symbol, is also being adopted. There will be no change in ownership or management.

Obituaries

William F. O'Neil

► William F. O'Neil, founder and board chairman of the General Tire and Rubber Co., Akron, Ohio, died at his home in Akron on September 4, of a heart ailment. He was 76 years old. A graduate of Holy Cross College, Mr. O'Neil, who started his business career at his father's textile mill in Worcester, Mass., was to found General Tire and develop it into one of the big five rubber companies with a many-faceted policy of diversification.

After graduating from college in 1907, Mr. O'Neil spent a year in an Akron dry-goods store belonging to his father, until symptoms of tuberculosis sent him to the West to recover. In Kansas City he met W. E. Fouse of Akron, and together the two men founded the Western Tire and Rubber Co. Starting as tire dealers, the partners added a tire-accessory shop in the rear of the store, and the company attained national scope. Mr. O'Neil then decided to go into the tire-manufacturing business for himself, and in 1915 he founded General Tire in Akron, concentrating on the replacement tire business, and utilizing the method of selling to a single dealer in a city instead of to the automobile manufacturers.

The firm embarked on its diversification program in 1942 when General Tire purchased the Yankee Network, a New England radio chain. The company which started with a textile mill processing cotton for tire cord was to expand to control forty-one companies and affiliates here and abroad. Through the years the company acquired the Mutual Broadcasting System and the Don Lee radio chain on the West Coast, both later sold; Crosley Motors, makers of a midget car; Bolta Products, the Textileather Company and the Pennsylvania Rubber Co. In 1956 it purchased control of the A. M. Byers Co. of Pittsburgh, the largest fabricator of wrought iron in the country.

Two of General's major subsidiaries are RKO-General, Inc., which owns and operates five television and seven radio stations, and Aerojet-General, which produces rocket-propulsion systems for many of the nation's missile programs, including the Titan, Polaris and Minute Man. The company grew to include a series of concerns that produced molded plastic furniture, iron and steel, synthetic upholstery, industrial chemicals, machine tools and one-man submarines now used by skin-divers.

Mr. O'Neil is survived by his wife, four sons, and a daughter.

Francis J. Wakem

► Francis J. Wakem, retired vice-president of industrial production of the Johns-Manville Corp., New York, N. Y., died May 30 in his home at Munsey Park. He was 63 years old. Mr. Wakem, a graduate of Yale University, had been with Johns-Manville for 36 years. He was president and director of the Mechanical Packing Association and the Asbestos Textile Institute, as well as a director of the Industrial Division of the Brake Lining Association. He is survived by his wife and a son.

William F. Ridge

► William F. Ridge, formerly president of two rubber companies, as well as an inventor and designer, died August 5. He was 84 years old. Mr. Ridge organized the Marathon Tire & Rubber Co. and was its president. At one time he was president of the Andes Rubber Co. of Toledo, Ohio.

Donald F. Fraser

► Donald F. Fraser, vice-president of manufacturing of Garlock Inc., Palmyra, N. Y., died September 12 at the Chesapeake and Ohio Hospital, Clifton Forge, Va., following a heart attack. He was 47 years old. A 1934 graduate of the University of Toronto with a B.A. degree in Science, he first joined the Dunlop Tire and Rubber Goods Co., Ltd., Toronto, Canada, as technical manager of the Latex Foam Sponge Department. From 1937 to 1943 he was a demonstrator with the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. He was with the Office of the Rubber Director and the Rubber Reserve Co., Washington, D. C. in charge of technical development and control of several government owned synthetic rubber plants in 1943 and 1944.

Mr. Fraser served as manager of the Rubber and Plastics Division of Monroe Auto Equipment Co., Monroe, Mich., from 1944 to 1948, and he was general manager of the Queen City Tulatex Corp., Burlington, Vt., from 1948 to 1949. He was vice-president and general manager of Rodic Chemical and Rubber Corp., New Brunswick, N. J. from 1949 until he joined Garlock in 1954, successively serving as acting chief engineer, works manager, production manager, and vice-president of manufacturing. His duties included supervision of all production facilities. He was a director of the New York Rubber Group, a member of the American Chemical Society, and the American Society of Mechanical Engineers.

Harry W. Goodman

► Harry W. Goodman, vice-president and director of sales of Circle Wire and Cable Corp., Maspeth, L. I., N. Y., died August 18 of a heart attack at his home in New York City. He was 69 years old. Mr. Goodman held a B.A. from New York University, and a law degree from New York Law School. A partner for many years in the Krisher Manufacturing Co., makers of metal products, he joined Circle Wire and Cable in 1932 as sales manager.

Mr. Goodman was also on the management board of Rockbestos Wire and Cable Co., New Haven, Conn. He is survived by his wife, a son, and three daughters.

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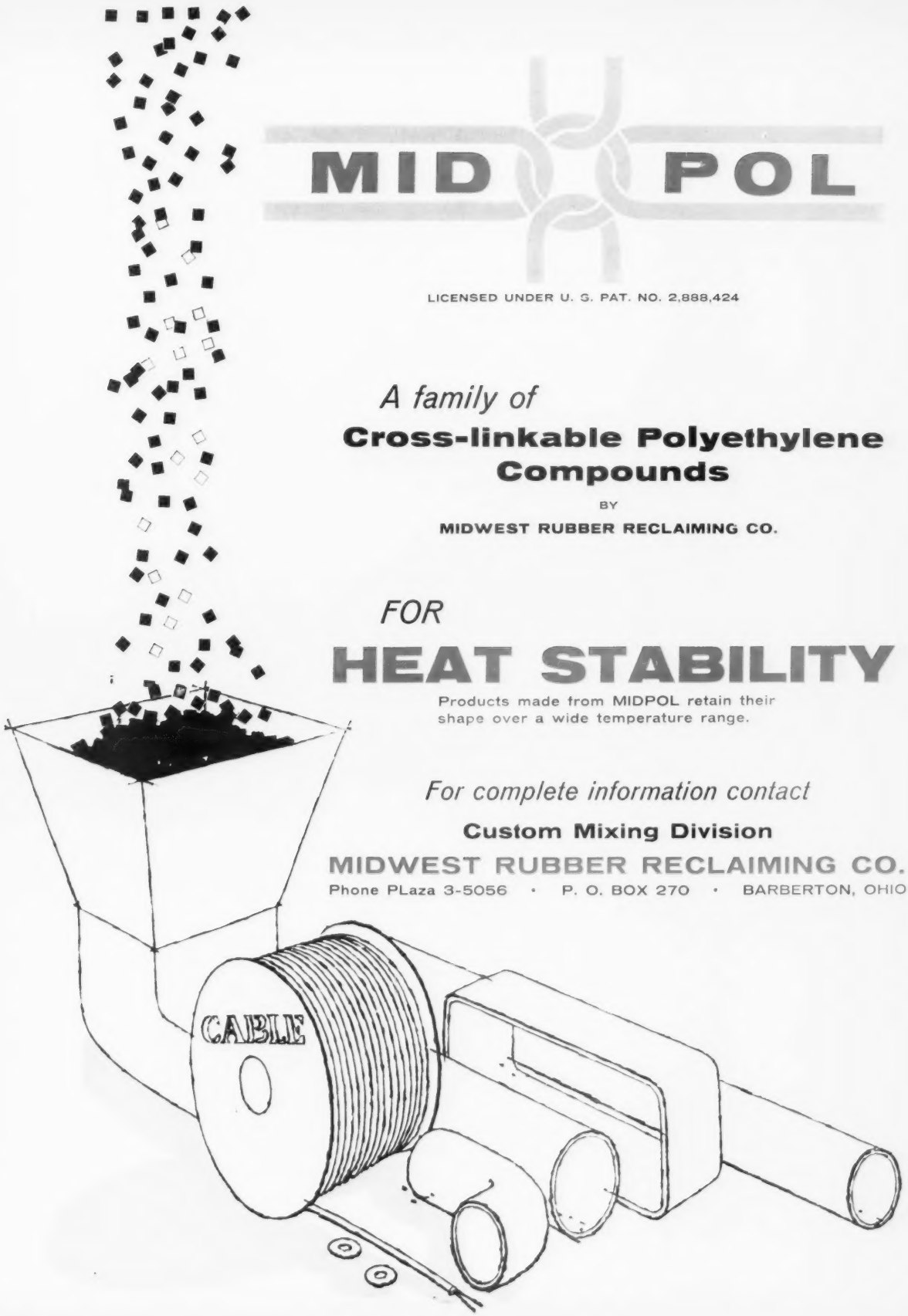

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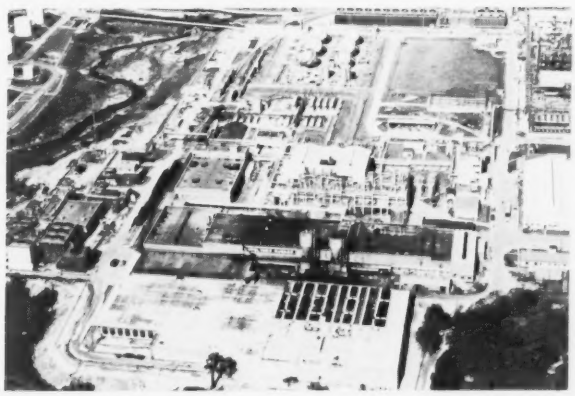

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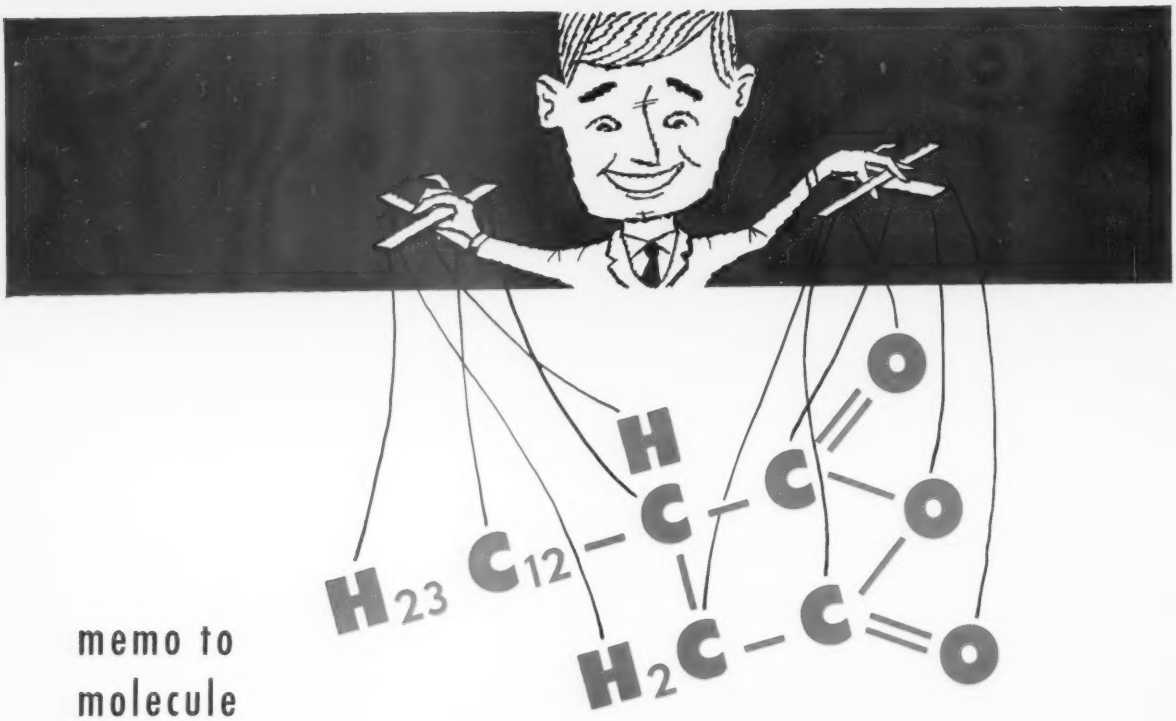

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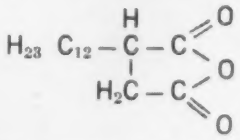

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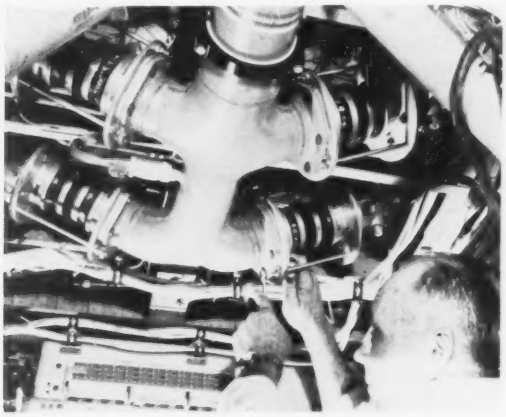
New Goods

Airplane Fuel Line Coupling

► A flexible rubber coupling for airplane fuel lines, said to weigh significantly less than metallic couplings, has been introduced by B. F. Goodrich Aviation Products Co., Akron, Ohio. The new couplings are internally reinforced with multiple fabric plies and withstand negative pressures as high as 10 inches of mercury without collapsing. Every coupling is tested to a proof pressure of 240 PSIG, and each is designed to withstand burst pressures up to 480 PSIG.



The flexible couplings connect metal fuel lines and prevent stress build-up, which is a problem of rigid metal fuel lines. It meets endurance requirements for deflection from the normal configuration in the axial, out-of-register parallelism and torsional directions, according to the company.

Neoprene Expansion Joint

► E. I. du Pont de Nemours & Co., Wilmington, Del., is marketing a new type of expansion joint which it reports can absorb the movement of concrete during extreme temperature changes without any bulge, dip, or gap in the top surface, and at all times keep a tight seal against water and dirt. The joint was developed by B. F. Goodrich Industrial Products Co., Akron, Ohio. Constructed of neoprene synthetic rubber and steel, it is now in use on highways, bridges, and airfield runways. The neoprene resists oil and sunlight and withstands all types of weather and abrasion. The joint is designed so the movement of concrete pushes together the neoprene cells or pulls them back to their original position like an accordion. Steel truss rods looping out from both sides anchor it securely to the end of each of the concrete panels. Because it is anchored in this manner, the surface stays flush with the top of the concrete.

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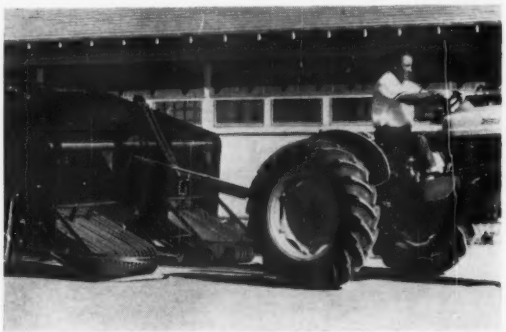
Rubber Belt Cotton Harvester

► The Rood Cotton Harvester, manufactured by the Garland Steel Co., Phoenix, Ariz., and equipped with 28 rubber belts made by B. F. Goodrich Industrial Products Co., Akron, Ohio, operates behind a farm tractor at about five to eight miles an hour, picking up fallen bolls from ten to 30 acres a day. The rubber belts are designed to work like fingers, salvaging fallen bolls that had previously been plowed under the ground because the expense of gathering them



was too high. Each 94 inches in circumference and 2 inches wide, the belts have cross-cut slots spaced about three-quarters of an inch apart. As the 28 belts rotate side by side the slots open on passing over the front pulley, then close as they leave the ground.

Urethane Rubber Shoe Lifts

► Silent Step heel lifts for women's shoes are made of Adiprene urethane rubber developed by E. I. du Pont de Nemours and Co., Wilmington, Del., and are manufactured by Silent Step Corp., St. Louis, Mo. They are said to often outwear the soles of the shoes on which they are used. The new lifts also eliminate the spreading that causes lifts to snag and ruin stockings, or to become caught, loosened, and lost in deep-piled carpeting, according to Du Pont. The resiliency of Adiprene provides a cushioning effect, and the lifts act as shock absorbers on hard concrete or stone surfaces. The Silent Steps are, in addition, fastened to a metal dowel pin that will extend the height of the heel and provide reinforcement.

Sigma Silicone Ear Plugs

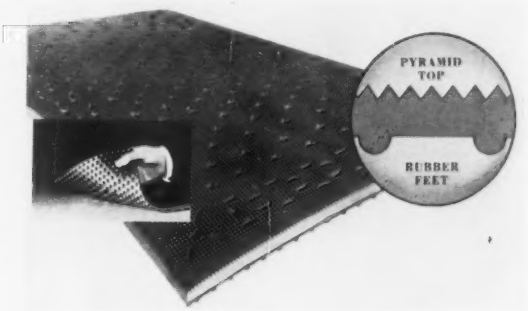
► Com-Fit ear plugs, manufactured by Sigma Engineering Co., Los Angeles, Calif., are molded of silicone rubber. Made with a triple flange to guarantee sealing of the ear canal, the plugs are made in a single size designed to fit all ear openings. They are said to be durable and pliable, non-toxic, non-allergenic, and may be boiled and sterilized for cleanliness. The plugs come packed in plastic carrying cases.

Polyolefin Tubing Material

► A polyolefin tubing and sleeving material which heat shrinks in diameter to form a tight bond, even over irregular shapes, has been announced by Sequoia Wire & Cable Co., New York, N. Y. Hyshrink, the new product, is said to be flame retardant and thermally stable. It can be slipped over terminals, connectors, wire and cable, conduit, and hose, in its expanded form. Upon application of heat the tubing shrinks in diameter to form a strong mechanical bond. It is said to have high dielectric and mechanical strength and tested resistance to most chemicals, including JP4 and 100/300 aviation fuels and hydraulic fluids. The new tubing, according to the manufacturer, also resists fungus growth, gives off no toxic fumes when heated, shows a weight increase of .01 per cent or less after immersion in water, and remains flexible and strong from temperatures of 67° to 275°F.

Custom Perforated Mat

► Custom-made mats for building entrances and lobbies, available in sizes and shapes for all areas, are being marketed by the R. C. Musson Co., Akron, Ohio. The mats, which incorporate safety features, have a pyramid surface which is said, in addition, to afford maximum cleaning efficiency. Rubber feet under the surface allow drainage and air circulation. The mats come in various designs: cloverleaf, round, hexagonal, or rectangular.



Extra Large Neoprene Glove

► An extra large glove size for men in the food processing industry has been added to the line of Stanzoil N-30 Whitecaps made by the Pioneer Rubber Co., Willard, Ohio. Made of milled Du Pont neoprene, the gloves are said to withstand oils, greases, acids, caustics and solvents. The red neoprene lining has a special satinized finish for ease in handling, and a non-slip finish is another convenience feature. The snug-to-tip curved fingers and tapered palms are engineered to fit the contours of the hand without restricting dexterity.

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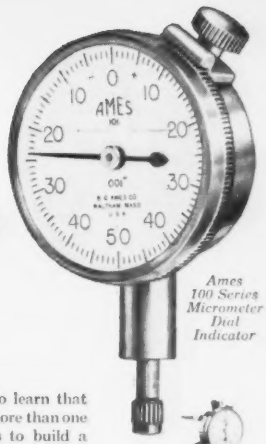

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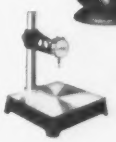

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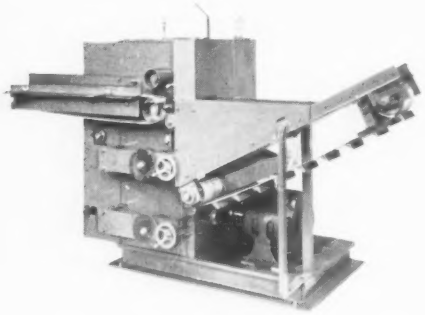

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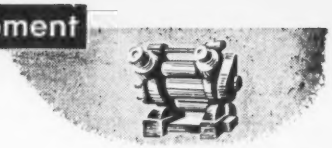
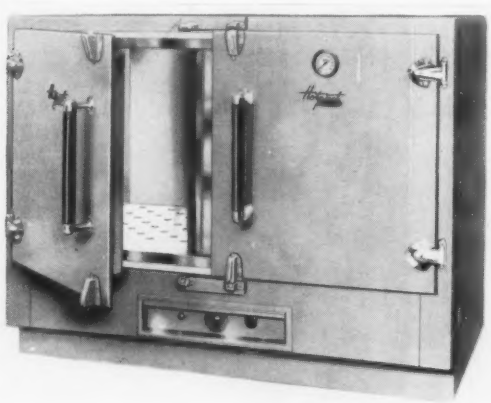


Hotpack Space Saving Oven

► A double-door, under-the-counter oven with a temperature range from 38° to 121°C. (250°F.), specially designed to conserve laboratory space, is available from Electric Hotpack Co., Inc., 5008 Cottman St., Philadelphia 35, Penna. The new oven, built to standard laboratory size, is used for artificial aging, drying and other thermal tests where controlled heating conditions are necessary. A calibrated adjustable thermostat is located on a recessed panel at the base. Maximum protection from accidental damage and unauthorized adjustments to thermostat are afforded by the recessed panel and a sturdy plexiglass cover. Constructed of heavy gage steel, the oven exterior is finished in gray enamel. Exterior is 48 by 30



by 36 inches. The double-door construction does not have a center post. A polished stainless steel interior chamber has a capacity of 11 cubic feet. Walls are insulated with a 3-inch blanket of decomposed glass wool. Three adjustable shelves are made of perforated metal. Highly resilient asbestos strips are compressed at the doors to form additional seals against thermal loss and air infiltration.

Plastechon Universal Tester

► A Plastechon Universal Tester, manufactured by the Plas-Tech Equipment Corp., Natick, Mass., is said to be capable of measuring tensile, flexural, and compressive properties of all types of materials at rates of loading ranging from 0.2 inches/minute to 8,000 inches/minute. Stress-strain curves are obtained automatically via oscilloscope-camera techniques. Engineering features include digital speed selection, servo response, and remote control operation.

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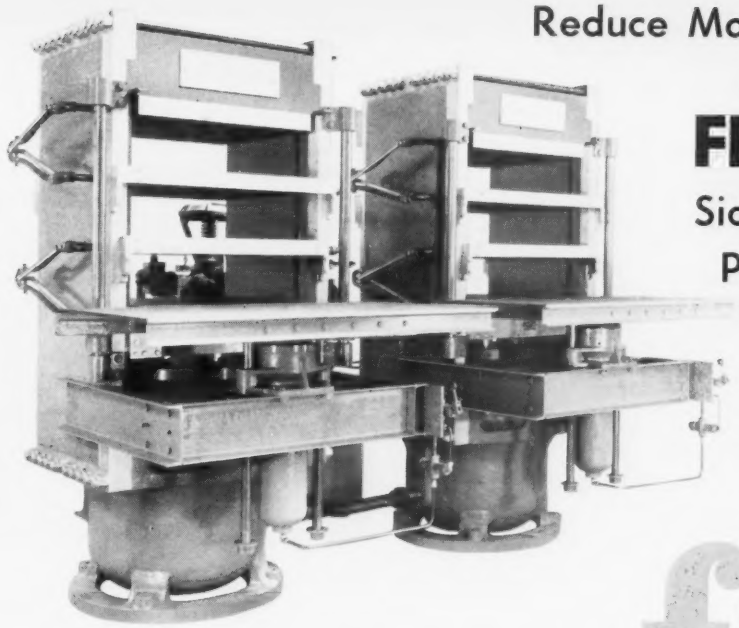

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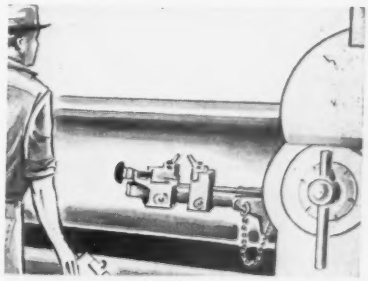

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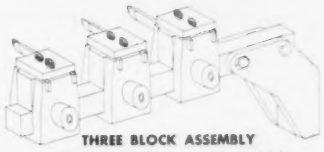

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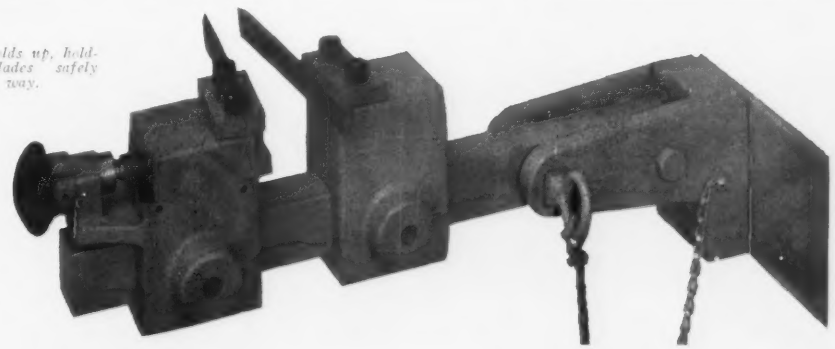
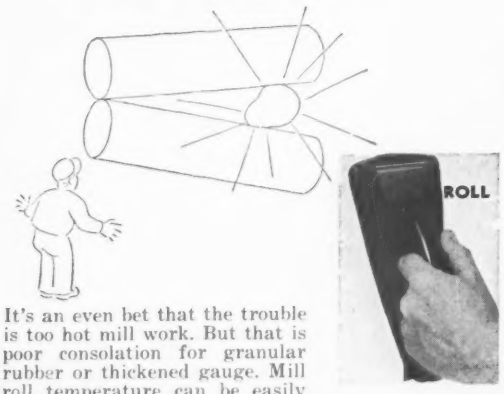


When Lumps show up in the Calender Rolls



It's an even bet that the trouble is too hot mill work. But that is poor consolation for granular rubber or thickened gauge. Mill roll temperature can be easily checked, therefore intelligently controlled by the use of the Cambridge Surface Pyrometer. It is an accurate, rugged instrument that can be used while the rolls are in operation. Its use will help cut costs and make better rubber products. *Send for Bulletin No. 194-SA.*

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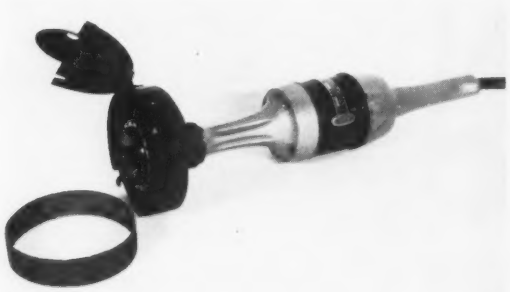
Solid Rubber Grinding Wheel

► A solid rubber grinding wheel for use with coated abrasive belts is being offered on 6-inch straight air grinders by Thor Power Tool Co., Aurora, Ill. Available under the trade name Mermac, the new type wheel fits directly on the spindle of the grinder. Abrasive belts in desired grits can be slipped over the wheel to give it an abrasive perimeter. The belts are held by centrifugal expansion of the rubber wheel while operating. According to the company, advantages



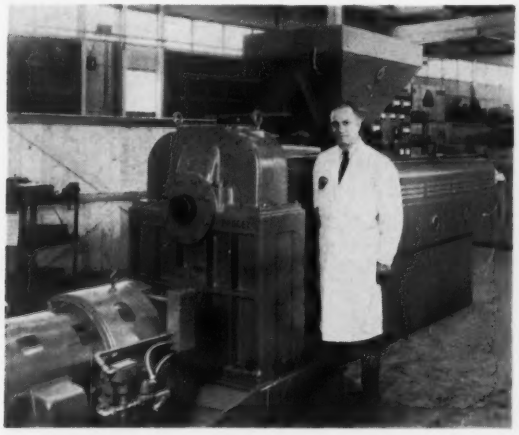
of the process include quick changing of belts, continuous balance, and finer finishing. The air grinders offer 100 per cent increase in air power with no increase in weight and a 50 per cent reduction of exhaust noise, it is reported. They have an over-speed control integral with the standard governor which guards normal speed controls and automatically cuts the air supply to the motor whenever a governor failure or other condition causes over-speeding. The grinders are available in speeds of 4,500 or 6,000 r.p.m. in 6-inch capacity.

Metlkor Cleaning Brushes

► Metlkor brushes, manufactured by M. W. Jenkins' Sons, Inc., 444 Pompton Ave., Cedar Grove, N. J., were originally designed to remove dirt and lint from the surface of paperboard rolls prior to printing. According to the manufacturer, these brushes are now finding application in the cleaning and polishing of cold rolled steel and other rolled metals, cleaning and polishing of foils prior to printing or processing, and the removal of grit and foreign matter from rolled plastics, textiles and rubber. Metlkor brushes are said to be engineered so that the surface of the material will not be damaged in any way. The bristles are made of DuPont Tynex nylon, or other materials according to use, and the cores are engineered from steel or aluminum. The brushes are designed for easy installation, and adapt well with any system, the manufacturer states.

Prodex HT Extruder

► Prodex Corp., Fords, N.J., has designed a new series of HT high torque extruders said to deliver the highest possible production rates from any given size. The new gear transmission used on these machines is equipped with change gears to permit selection of the optimum reduction ratio and screw speed at any time. The Prodex HT series of extruders has gear transmissions capable of delivering as much torque as the screw can safely handle, the company states, and, in



addition, the change gear provision permits the extrusion of all materials on the same machine under efficient conditions, without using large motor drives. Along with the new gear transmission, the screw bank has been redesigned to handle the highest possible torque, and the units also have improved thrust housings with safety glass inspection covers. A new seal has been introduced at the screw shank to avoid leakage of powders and to permit the use of vacuum hoppers. The company reports that this seal can be changed in minutes without removing the screw from the machine.

Hotpack Hi-Lo Test Chamber

► Electric Hotpack Co., Inc., 5076 Cottman St., Philadelphia, Penna., has developed a modified addition to its Hi-Lo Temperature Test Chamber series. Equipped with dual timers, this portable, table top chamber is said to allow automatic cycling of high and low temperature levels for varied periods of time without constant control adjustment. The temperature range is from —100°F. to +400°F. plus or minus 1°F. Controls include dual thermostats plus an automatic over-temperature controller that breaks heater circuits in the event that chamber temperatures exceed the control setting. The coolant is liquid CO_2 dispersed by a high velocity blower. Convenient pull-out drawer facilitates loading and unloading. The chamber is 14 by 10 by 10 inches.

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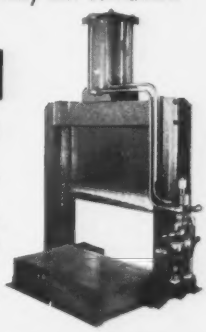

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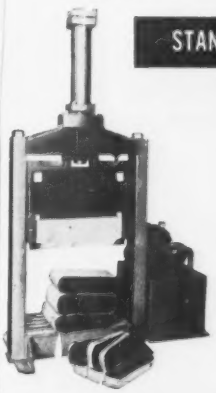

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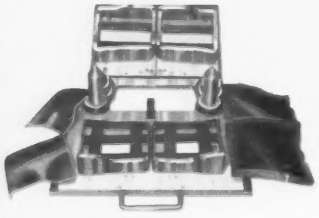
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Reviews

Methoden der Organischen Chemie "Houben-Weyl" (Methods of Organic Chemistry). (Fourth Edition). Edited by Eugene Muller in cooperation with O. Bayer, H. Meerwein and K. Ziegler. Published by George Thieme, Stuttgart, Germany. 20 Volumes—in German. 7½ x 10½ in. Average price $25.00 per volume.

(Editor's Note: An over-all review of "Houben-Weyl" appeared in the March, 1957 issue of RUBBER AGE. Reviews of Volume II, III Part 1, and VIII appeared in April, 1957; of Volumes III Part 2, IV Part 2, VII Part 1, and IX in May, 1957; of Volume XI Part 1 in January, 1958; and of Volume I Part 1 in September, 1958. Volume I Part 2, and Volume V Part 4 are reviewed below. Additional reviews will be presented in this column as additional volumes become available.)

Volume I, Part 2. "Allgemeine Laboratoriumspraxis II." By A. Berthmann (Dynamit AG., Leverkusen), K. Blumrich (Farbwerke Hoechst AG., Frankfurt a.M. Hoechst), W. Büche, H. Kienitz, H. Metzger and G. Schiller (Badische Anilinund Sodafabrik AG., Ludwigshafen/Rhein), W. Bunge, R. Erdmenger, H. Jonas, F. Möller, E. Müller, M. Quaedvlieg, H. Rickert, H. Schwarz, W. Simmler, W. Stroh, and A. Wingler (Farbenfabriken Bayer AG., Leverkusen), R. Jaeckel (Universität Bonn), Th. Lange (Lippstadt), H. Lieb (Universität Graz), E. Müller (Chemisches Institut der Universität Tübingen), H. Rumpf (Technische Hochschule Karlsruhe) and W. Schöniger (Sandoz AG., Basel). 1017 pp. DM 196.

Typical for the Houben-Weyl series, the contributors are again drawn from industry and universities, with most of the authors from chemical industry, which assures a good, practical and sound theoretical coverage of the subject matter. The excursions into practical applications extend in some cases to pilot plant and even plant practices. Brief references to plant practices would have sufficed in the opinion of this reviewer, which would have permitted more extensive treatment of laboratory techniques with which this volume primarily deals. The chapter dealing with micro methods, for instance, is rather short, probably because of lack of space. The work by Kofler and Kofler and other workers in the field, although mentioned elsewhere in the book, appears neglected. This reviewer hopes that one of the future supplement volumes will correct this by being more comprehensive on micro and semimicro techniques so important in modern laboratories. This comment is offered more as a response to the editor's request for constructive suggestions than an expression of severe criticism.

The first section of the book (183 pp.) deals with methods for comminution and distribution of substances, and comprises discussions of particle reduction, sieving, sifting and size classification of solid substances, mixing of gases, liquids, powders and plastic substances, emulsions and emulsifying agents, including a brief but excellent treatment of the question of emulsifier selection on the basis of the hydrophile-lipophile balance, and of the nature, formation, breaking and prevention of foams. Theory and laboratory practices are covered, with some discussion of plant practices.

The second section (573 pp.) discusses general laboratory methods and is organized under the headings,

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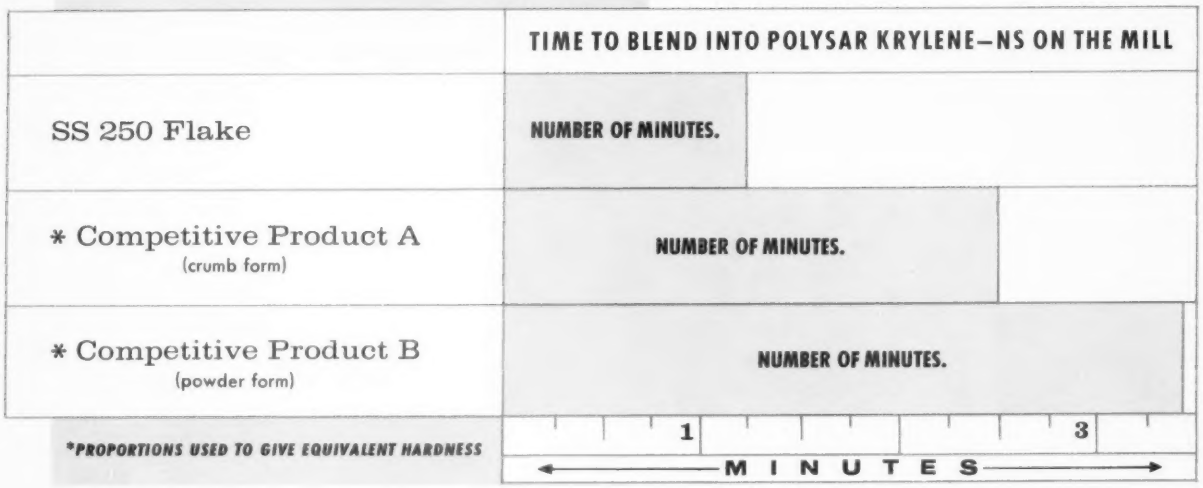

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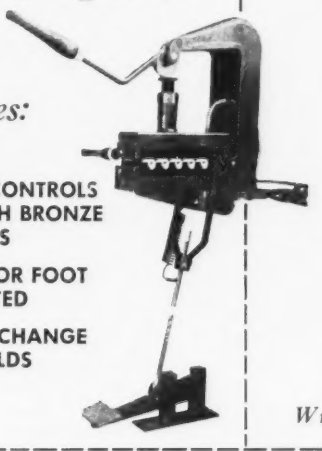

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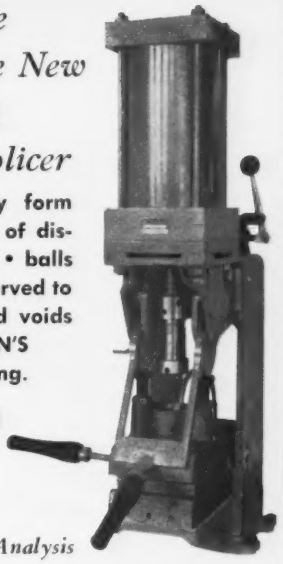

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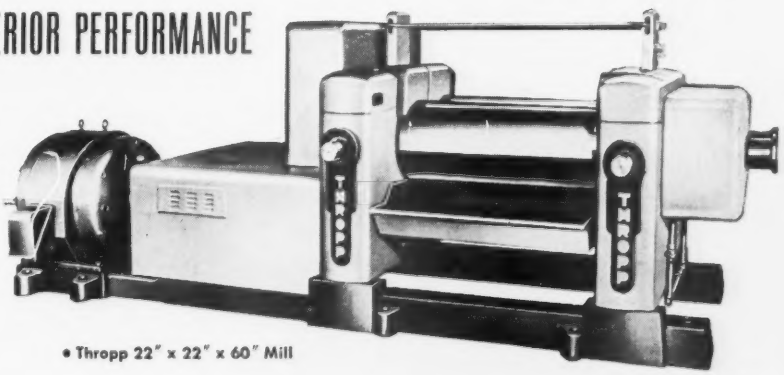

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The third section (104 pp.) is devoted to solvents and drying agents, and contains, in addition to a discussion of generally used solvents, several valuable tables of physical constants.

The fourth section of the book (55 pp.) is devoted to safety precautions and discusses prevention and treatment of accidental injuries in the laboratory, and contains a brief discussion of carcinogenic substances. An extensive author index and subject index concludes the volume.

Volume V, Part 4. "Halogenverbindungen (Fortsetzung." By N. Kreutzkamp and H. Meerwein (Universität Marburg), A. Roedig (Universität Würzburg), and R. Stroh (Farbenfabriken Bayer AG., Leverkusen). 894 pp. DM 180. This is the first to appear of a planned four-part volume to cover in the first two parts hydrocarbons, and in the second two, their halogen derivatives. Volume V, part 3, will cover fluorine compounds and the preparation of chlorine compounds.

The present volume consists of three main sections, (I) preparation of bromide compounds (504 pp.), (II) preparation of iodine compounds (162 pp.) and (III) reactivity and conversion of chlorine, bromine and iodine compounds (98 pp.). The author index and subject index are again extensive, and comprise 118 pages.

The chapter on preparation of bromine compounds starts with a review of brominating agents, discussing their general properties, preparation, purification, drying and general recommendations. This very useful section is followed by a presentation of specific methods of introducing the bromine atom, by addition, by hydrogen exchange, by exchange with other atoms or groups, and other preparative methods. The chapter on preparation of iodine compounds again starts with a review of available agents for introducing the iodine atom, and is followed again by an excellent presentation of specific preparative methods.

The third chapter discusses the reactivity of chlorine, bromine and iodine compounds and preparative methods employing halogen compounds as starting materials.

This volume contains a great amount of valuable information and is not only a source book of tested methods, but will prove to be a source of inspiration for new, original work when browsing through the volume.

Both volumes reviewed above are highly recommended. No laboratory engaged in work dealing with organic preparations can afford to be without the Houben-Weyl, regardless of other reference books available. Included with Volume I/2 is one page of corrections of printer's errors, etc. With Volume V/4 are included two pages of corrections. It is suggested that the owners of the volumes do not put off making the corrections listed, since the correction sheets can easily get lost; they are only inserted, not bound into the volumes.

F. R.

BOOKLETS, CATALOGS, etc.

RTV Liquid Silicone Rubber. (Technical Data Book S-3.) Silicone Products Department, General Electric Co., Waterford, N. Y. 8½ x 11 in. 12 pp.

The publication describes product and application data on the complete family of RTV (room temperature vulcanizing) silicone rubber compounds. In addition to up-to-date information on product properties and data describing RTV compounds —20, —40, —60, —90 and silicone rubber sponge, this 12-page bulletin contains RTV-11, the newest and lowest viscosity liquid silicone rubber compound. It also includes additional information on thermal conductivity compression set of RTV's along with an expanded section providing new data on their heat aging and electrical properties. A new section in the bulletin deals with molding RTV in RTV. Featured in the bulletin are suggestions for handling RTV compounds, curing and viscosity characteristics and information on RTV primers for bonding applications.

•

How Silicones Work for the CPI. (Reference 1-119.) Dow Corning Corp., Midland, Mich. 8½ x 11 in. 8 pp.

This new manual cites how various forms of silicones help design, process and maintenance engineers expand capacity, cut costs, lower maintenance, reduce downtime, increase reliability, and improve job conditions. The booklet is concise, comprehensive, highly-illustrated, and points up numerous different ways these versatile engineering materials, silicones, are serving the industry today. Included is information about many silicones, from antifoamers to foamers, from adhesives to adhesives, from paints to creams, from water repellants to dust filters. The advantages of silicone electrical insulating materials and systems in motors, transformers and generators are also briefly described.

•

When Reclaim Is Used. The Rubber Reclaimers Association, Inc., 101 West 31st St., New York 1, N. Y. 8½ x 11 in. 4 pp.

This brochure contains the talk given by John E. Brothers, chief chemist, Ohio Rubber Co., Willoughby, Ohio, at the December 3, 1959, meeting of the Fort Wayne Rubber and Plastics Group. Mr. Brothers' remarks indicate the extent to which reclaimed rubber can be employed to minimize or eliminate many of today's factory problems. The title of his presentation was "A Mechanical Goods Compounder Looks at Reclaimed Rubber." He reviews two compounds that move through the Ohio Rubber plant in very high volume, stressing calendering and frictioning. He also discusses low cost specification compounding with reclaimed rubber.

CORRECTION

In reviewing **Engineering Design with Rubber**, by A. R. Payne and J. B. Scott, published by Maclaren and Sons, Ltd., London, England, in the August 1960 issue, we incorrectly listed Palmerton Publishing Co. as the U. S. distributor. The book is being distributed in the United States by Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y.

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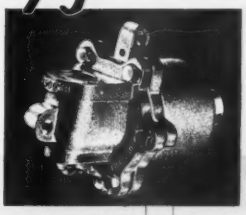

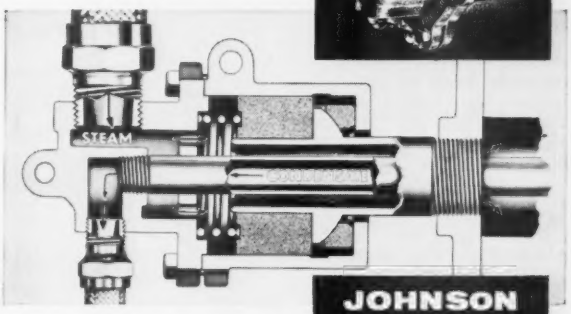

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Basic Carbonate of White Lead	Red Lead (95%-97%-98%)
Sublimed White Lead	Sublimed Blue Lead

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The Eagle-Picher Company
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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

The price of natural rubber on the New York Commodity Exchange has moved in a range of 175 points since our last report (September 1), high for the period being 35.75c reached on September 1, 16 and 19, and low being 34.00c reached on September 8. The average price of spot rubber for the month of September was 35.04c based on 21 trading days. This compares with an average of 36.69c in the previous month.

The International Rubber Quality and Packing Conference at Singapore has decided to eliminate 12 overlapping grades and the substitute 10 new international grades universally acceptable in world markets. For the last 16 years, 12 of the 36 grades of rubber which over-lapped have been traded both as Singapore and the Rubber Manufacturers Association of N. Y. grades, and these 12 were eliminated after adoption of recommendations from grading experts.

New Grades Announced

The new grades according to a press statement are acceptable to consuming manufacturers as being suitable for their various compounding manufacturing processes and also to the producing countries as being representative of the material available. The brand new international grades are:

International Four, Five and Six ribbed smoked sheet; International Two, Three and Four clean thick blanket crepe; and International One, Two, Three and Four clean thin brown crepe. It was not clear when the eliminated grades will cease to be recognized, but it was indicated that contracts already concluded for months ahead in these types will still have to be fulfilled.

Suggests Price Program

Malayan Prime Minister Tengku Abdul Rahman called on the International Rubber Study Group to consider fixing an economic price for natural rubber. Stabilization of the natural rubber price is to be thrashed out at the fifteenth meeting of the group which is being attended by delegates from twenty-one countries. The main difficulties since Malaya brought up the issue at Hamburg, Germany, in 1958 have been the price margin and deciding the size of a buffer stock pool to prevent price fluctuations, officials declared.

"Malaya itself depends on rubber for 60 per cent of its foreign exchange earnings," Mr. Rahman said. "For this reason the achievement of a reasonable degree of stability in the production, trade and price of natural rubber is of the utmost concern to us. For the Federation of Malaya and those other countries whose economies depend on rubber, the price should be maintained at certain levels," he declared.

NEW YORK, OCTOBER 1, 1960

Price Data

Closing Rubber Prices
on New York Commodity Exchange

FROM SEPT. 1 TO SEPT. 30

Sept.	Spot	Nov.	Jan.	Mar.	Sales
1	35.75	34.80	33.85	33.25	78
2	35.00	34.35	33.60	33.00	30
3	....	....	....	....	..
4	....	....	....	....	..
5	....	....	....	....	..
6	34.75	33.80	33.10	32.50	73
7	34.50	34.10	33.40	32.95	112
8	34.00	33.60	33.00	32.60	47
9	34.25	33.90	33.30	32.90	34
10	....	....	....	....	..
11	....	....	....	....	..
12	34.50	33.90	33.40	32.90	35
13	35.00	34.68	33.95	33.45	48
14	35.25	34.90	34.25	33.60	78
15	35.00	34.55	33.75	33.25	26
16	35.75	35.55	34.65	34.15	96
17	....	....	....	....	..
18	....	....	....	....	..
19	35.75	35.30	34.44	34.04	54
20	35.50	35.05	34.05	33.50	52
21	35.00	34.80	33.75	33.35	51
22	35.25	34.75	33.60	33.00	18
23	35.38	34.85	33.65	33.10	25
24	....	....	....	....	..
25	....	....	....	....	..
26	35.00	34.30	33.20	32.70	92
27	34.75	34.10	33.05	32.70	25
28	34.75	34.00	33.00	32.60	23
29	35.00	34.50	33.35	33.00	17
30	35.63	35.10	34.00	33.40	65

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.35⅝
Oct.	.35⅛
Nov.	.35
Thin Latex Crepe:	
Spot	.37½
Thin Brown Crepe, No. 2	.30
Flat Bark Crepe	.24¼

London Market
(Standard Smoked Sheets)

Nov.	33.82 — 33.96
Jan.-Mar.	33.23 — 33.52

Singapore Market
(Standard Smoked Sheets)

Nov.	32.87 — 32.95

Middling Upland Quotations

	Aug. 31	Sept. 30		
	Close	High	Low	Close
Oct.	31.02	31.55	31.48	31.49
Nov.	31.27	31.41	31.32	31.41
Dec.	31.80	31.87	31.86	31.85

Notes & Quotes

Farmers will spend $320,000,000 for tires this year, according to Gerard W. Brooks, director of marketing for the Tire Division, U. S. Rubber Co. Mr. Brooks said that sum would include tires for all vehicles used on the farm, including passenger cars. Based on studies of the farm tire market, the average large farm will spend $155 for tires, while the average small farm's expenditure would amount to $39, he said. Farms rated medium in size will spend an average of $68 on tires, he added.

Synthetic Rubber

The U.S. Department of Commerce reports that in the first seven months of this year, 875,839 long tons of synthetic rubber were produced and 643,570 long tons consumed. This compares with 761,638 long tons and 612,674 long tons, respectively, in the first seven months of 1959.

Analysts at Merrill Lynch, Pierce, Fenner & Smith point out that it is a little difficult to determine what was more disconcerting to the producing industry about the July domestic statistics: total consumption or the synthetic ratio of total use. Total new rubber used at 115,000 tons was the smallest for any month since May 1959. Natural alone was only 35,000 tons versus 42,600 in June and 47,600 in July 1959.

Synthetic Progress

Meanwhile, synthetic continued to take territory away from natural. It represented 69.51 per cent of the total quantity utilized, a new all-time high. For the first seven months this meant 68.19 per cent versus only 65.35 per cent in the corresponding period last year, a very appreciable jump and all the more significant when observed that for years, regardless of the price, 65-35 per cent division was generally an unbreachable barrier.

Some trade observers think that for the full calendar year, the loss of domestic consumption of natural against 1959 may approximate 45,000 tons. For the first half, the loss has come to 15,000 tons, and with July included to nearly 25,000 tons. Thus, some 20,000 tons more of lag would be still ahead.

Psychological Pressure

Another pressure, still mostly psychological, was on the market recently. B. F. Goodrich announced that the "test tube" natural is now available to U. S. and Canadian manufacturers for manufacture by license. This is the product which ultimately might completely replace crude. In fact, in some of natural's best product categories, the synthetic tree rubber has tested superior to the genuine natural. Important production of this type probably is still several years away.

In any event, it will readily be seen that the synthetic rubber segment of the industry may be entering a new era. The historical competition which has been evident in past years between natural and synthetic rubber may give way to a new battle—one type of synthetic versus another. There are indications that this is already happening, if one is to go by claims and counterclaims made on behalf of one type of synthetic rubber polymer against another. To this extent, the synthetic rubber industry may be entering a new era, and with the entrance of the new era will develop a whole new series of problems.

The officers and directors of Stewart Bolling & Company, Inc., pledge to continue the policies of the founder. We will continue to serve the rubber and plastics industries with the quality of product and service which has become associated with the company since its founding 35 years ago.

The present officers contemplate no change whatever in ownership, nor is there any thought of merging the facilities, physical or personnel, with those of any other organizations competing with or complementing the present lines of equipment made by Stewart Bolling & Company, Inc.

Our intention is to improve and expand the facilities of Stewart Bolling & Company in every practical manner and degree.

M. D. BOLLING
President and Treasurer

J. G. GRIMM
Vice-President and Sales Manager

J. T. MATSUOKA
Director of Engineering

THADDEUS SOBIERAJ
Plant Superintendent

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NO WELDED FRAME CONSTRUCTION

Stewart Bolling

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SLABSIDE
BOLT-TYPE
RING-TYPE
• •
PUMP UNITS
ELEVATORS

Precision built presses produce accurately. There are no weldments in Bolling slabside press frames. Cast steel cylinders are not welded to the base. Frame sides are bolted. A minimum of deflection—no weak points. Maintenance costs practically nothing, another operating dividend from sound design and construction. Bolling slabside presses are made in sizes ranging from 20x"20" through 48"x48".

Write for new Catalog 61.

Stewart Bolling
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Hydraulic Presses • Pump Units • Accumulators • Elevators • Bale Splitters • Vulcanizers
Speed Reducers • Gears • Extruders

PRICES OF COMMERCIALLY AVAILABLE

Dry Rubber

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene NF	.4900 [1]
Butaprene NH	.6500 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1NS	.6400 [2]
Chemigum N3NS and N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N6B	.5000 [2]
Chemigum N7	.5000 [2]
Chemigum N8	.5000 [2]
Chemigum N600	.5000 [2]
Herecol N-33	.6800 [2]
Hycar 1001 and 1041	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1042 and 1043	.5000 [2]
Hycar 1051	.5800 [2]
Hycar 1052	.5000 [2]
Hycar 1053	.5000 [2]
Hycar 1072	.6400 [2]
Hycar 1203	.4600 [2]
Hycar 1312	.5000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril B and BJ	.5000 [2]
Paracril BLT and BJLT	.5000 [2]
Paracril C and CLT	.5800 [2]
Paracril CV	.6300 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Paracril OZO	.4600 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]

Butadiene-Styrene Types

Ameripol 1000	.2410 [2]
Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1006 (crumb)	.2475 [2]
Ameripol 1007	.2410 [2]
Ameripol 1009	.2475 [2]
Ameripol 1009 (crumb)	.2590 [2]
Ameripol 1011	.2475 [2]
Ameripol 1012	.2425 [2]
Ameripol 1012 (crumb)	.2490 [2]
Ameripol 1013	.2410 [2]
Ameripol 1013 (crumb)	.2615 [2]
Ameripol 1500 and 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1605	.1900 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1708	.1910 [2]
Ameripol 1710	.1885 [2]
Ameripol 1712	.1885 [2]
Ameripol 1805	.1550 [2]
Ameripol 1808	.1480 [2]
Ameripol 1809	.1545 [2]
Ameripol 1810	.1400 [2]
Ameripol 4600	.2410 [2]
Ameripol 4601	.2410 [2]
Ameripol 4650	.1820 [2]
Ameripol 4651	.1770 [2]
Ameripol 4652	.1425 [2]
Ameripol 4654	.1870 [2]
Ameripol 4655	.1820 [2]
Ameripol 4659	.1820 [2]
Ameripol 4660	.1870 [2]
Ameripol 4664	.1845 [2]
Ameripol 4667	.2080 [2]
Ameripol 4700	.1750 [2]
Ameripol 4752	.1600 [2]
Ameripol 4756	.1545 [2]
Ameripol 4758	.1450 [2]
Ameripol 4759	.1598 [2]
Ameripol 4760	.1576 [2]
Ameripol 4761	.1710 [2]
ASRC 1000	.2410 [2]
ASRC 1001 and 1004	.2410 [2]
ASRC 1006	.2410 [2]
ASRC 1009	.2475 [2]
ASRC 1018	.2700 [2]
ASRC 1019	.2650 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
ASRC 1503	.2625 [2]
ASRC 1703	.2060 [2]
ASRC 1708	.1910 [2]
ASRC 1712	.1885 [2]
ASRC 1713	.1750 [2]
ASRC 3105 and 3106	.2410 [2]
ASRC 3110	.2600 [2]
Baytown B-129	.1960 [2]
Baytown B-132	.1583 [2]
Baytown B-134	.1900 [2]
Baytown B-142	.1515 [2]
Baytown B-151	.1550 [2]
Baytown B-160	.1569 [2]
Baytown B-166	.1507 [2]
Baytown 1600	.1930 [2]
Baytown 1601	.1930 [2]
Baytown 1602	.1930 [2]
Baytown 1801	.1760 [2]
Baytown 1803	.1740 [2]
Baytown 1811	.1569 [2]
Baytown 8675	.1820 [2]
Baytown 8676	.1876 [2]
Baytown 8680	.1775 [2]
Baytown 8681	.1835 [2]
Baytown 8775	.1545 [2]
Baytown 8776	.1679 [2]
Baytown 8778	.1480 [2]
Baytown 8779	.1496 [2]
Baytown 8780	.1507 [2]
C-102 (Shell)	.2300 [2]
Carbomix 3750	.1820 [2]
Carbomix 3751	.1545 [2]
Carbomix 3752	.1845 [2]
Carbomix 3753	.1640 [2]
Carbomix 3756	.1569 [2]
Carbomix 3757	.1480 [2]
Carbomix 3758	.1545 [2]
Carbomix 3760	.1496 [2]
CB-102 (Shell)	.1850 [2]
Copo 1006	.2410 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1505 NS	.2610 [2]
Copo 1507	.2410 [2]
Copo 1712	.1885 [2]
Copo 1713	.1750 [2]
Copo 1714	.1725 [2]
Copo 1773	.2060 [2]
Copo 1778	.1910 [2]
Copo 2000	.2775 [2]
Copo 3700	.1725 [2]
Copo 3701	.1750 [2]
Copo 3900	.2310 [2]
FR-S 146	.2410 [2]
FR-S 158	.3000 [2]
FR-S 173	.2060 [2]
FR-S 178	.1910 [2]
FR-S 181 and 182	.2410 [2]
FR-S 184	.1885 [2]
FR-S 1000	.2410 [2]
FR-S 1001	.1410 [2]
FR-S 1004 and 1006	.2410 [2]
FR-S 1007	.2410 [2]
FR-S 1009	.2475 [2]
FR-S 1010	.2600 [2]
FR-S 1012	.2425 [2]
FR-S 1013	.2410 [2]
FR-S 1014	.2810 [2]
FR-S 1500 and 1502	.2410 [2]
FR-S 1703	.2060 [2]
FR-S 1710 and 1712	.1885 [2]
Gentro 1500	.2410 [2]
Gentro 1712	.1885 [2]
Gentro-Jet 9152	.2080 [2]
Gentro-Jet 9153	.1820 [2]
Gentro-Jet 9154	.1845 [2]
Gentro-Jet 9250	.1580 [2]
Gentro-Jet 9251	.1640 [2]
Gentro-Jet 9252	.1670 [2]
Gentro-Jet 9275	.1500 [2]
Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1022	.2950 [2]
Naugapol 1023	.3150 [2]
Naugapol 1503	.2625 [2]
Naugapol 1504	.0330 [2]
Naugapol 6003	.2700 [2]
Naugapol 6100	.3100 [2]
OB-102 (Shell)	.1825 [2]
OB-104 (Shell)	.1475 [2]
OB-106 (Shell)	.1510 [2]
OB-110 (Shell)	.1410 [2]
OB-111 (Shell)	.1540 [2]
OB-113C (Shell)	.1750 [2]
OB-114C (Shell)	.1420 [2]
OB-116 (Shell)	.1810 [2]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2475 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500 and 1502	.2410 [1]
Philprene 1503	.2625 [1]
Philprene 1601	.1930 [1]
Philprene 1603	.1960 [1]
Philprene 1605	.1900 [1]
Philprene 1606	.1820 [1]
Philprene 1609	.2080 [1]
Philprene 1703	.2060 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1885 [1]
Philprene 1803	.1740 [1]
Philprene 1805	.1550 [1]
Philprene 1808	.1480 [1]
Plioflex 1006	.2410 [2]
Plioflex 1500C	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1507	.2410 [2]
Plioflex 1508	.2410 [2]
Plioflex 1510	.2410 [2]
Plioflex 1710C and 1712C	.1885 [2]
Plioflex 1713	.1750 [2]
Plioflex 1714C	.1725 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Kryflex 200	.2510 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol 651	.1885 [2]
Polysar Krynol 652	.1910 [2]
Polysar S-630	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.2875 [2]
S-1000	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1009	.2400 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1509	.2300 [2]
S-1600	.1825 [2]
S-1602	.1825 [2]
S-1604	.1825 [2]
S-1605	.1800 [2]
S-1606	.1750 [2]
S-1607	.1750 [2]
S-1703	.1950 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1710	.1775 [2]
S-1712	.1775 [2]
S-1778	.1800 [2]
S-1800	.1475 [2]
S-1802	.1410 [2]
S-1803	.1650 [2]
S-1804	.1750 [2]
S-1806	.1510 [2]
S-1807	.1540 [2]
S-1808	.1420 [2]
S-7652	.1875 [2]
S-7701	.1850 [2]
SP-103 (Shell)	.2900 [2]
Synpol 1000 and 1001	.2410 [2]
Synpol 1002	.2435 [2]
Synpol 1006	.2410 [2]
Synpol 1007	.2410 [2]
Synpol 1009	.2475 [2]
Synpol 1012	.2425 [2]
Synpol 1013	.2410 [2]
Synpol 1061	.2410 [2]
Synpol 1500	.2410 [2]
Synpol 1502	.2410 [2]
Synpol 1551	.2410 [2]
Synpol 1703	.2060 [2]
Synpol 1707	.1910 [2]
Synpol 1708	.1910 [2]
Synpol 1712	.1885 [2]
Synpol 8103	.2401 [2]
Synpol 8151	.1820 [2]
Synpol 8152	.1860 [2]
Synpol 8200	.1910 [2]
Synpol 8201	.1750 [2]
Synpol 8202	.1725 [2]
Synpol 8208	.1750 [2]
Synpol 8255	.1480 [2]
Synpol 8253	.1584 [2]
Synpol 8254	.1545 [2]
Synpol 8266	.1598 [2]
Synpol 8267	.1640 [2]

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200 and 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

SYNTHETIC RUBBER POLYMERS

Chlorosulfonated Polyethylene

Hypalon 20	.4700 [2]
Hypalon 30	.6000 [2]
Hypalon 40	.5000 [2]

Fluoroelastomers

Kel-F Fluorel	$15.00 [2]
Kel-F 3700 and 5500	$16.00 [2]
Vitron A and A-HV	$10.00 [2]
Viton B	$13.00 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type AD	.5500 [2]
Neoprene Type FB	.6500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WB	.4100 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type WRT	.4500 [2]
Neoprene Type WX	.4100 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.5000 [2]
Thiokol Type FA	.6900 [2]
Thiokol Type ST	1.2500 [2]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	2.50 [2]
Silastic (gums)	4.00 [2]
Union Carbide (gums)	4.00 [2]
Union Carbide (compounds)	2.50 [2]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400 and N-401	.5400 [1]
Chemigum 200	.4800 [2]
Chemigum 235	.5300 [2]
Chemigum 236	.5300 [2]
Chemigum 245	.4500 [2]
Chemigum 246	.4500 [2]
Chemigum 247	.4500 [2]
Chemigum 248	.4500 [2]
Hycar 1512	.4500 [2]
Hycar 1531	.5300 [2]
Hycar 1552	.4500 [2]
Hycar 1561	.5300 [2]
Hycar 1562	.4500 [2]
Hycar 1571	.5300 [2]
Hycar 1572	.4500 [2]
Hycar 1577	.4500 [2]
Nitrex 2612	.4500 [1]
Nitrex 2616	.5300 [1]
Nitrex 2620	.4500 [1]
Nitrex 2625	.4500 [1]
Tylac 640	.4500 [1]
Tylac 740	.4900 [1]
Tylac 840	.5300 [1]
Tylac 1640	.5400 [1]
Tylac 2241	.5300 [1]
Tylac 2430	.5000 [1]
Tylac 2570	.5300 [1]
Tylac 2830	.4500 [1]

Butadiene-Styrene Types

CL-101 (Shell)	.2800 [2]
Copo 2000	.2775 [2]
Copo 2101	.3000 [2]
Copo 2102	.3200 [2]
Copo 2105	.3200 [2]
Copo 2108	.3000 [2]
Copo 2109	.2775 [2]
Copo 2110	.3200 [2]
Copo 3852	.3000 [2]
FR-S 110	.3000 [2]
FR-S 150	.3000 [2]
FR-S 151	.2900 [2]
FR-S 174	.2950 [2]
FR-S 176	.2775 [2]
FR-S 2000	.2775 [2]
FR-S 2001	.2775 [2]
FR-S 2002	.3000 [2]
FR-S 2003	.3050 [2]
FR-S 2004	.3050 [2]
FR-S 2006	.2900 [2]
FR-S 2105	.3200 [2]
Naugatex 2000	.2775 [1]
Naugatex 2001	.2775 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [1]
Naugatex 2105	.3200 [1]
Naugatex 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Naugatex 2113	.2900 [1]
Naugatex J-8174	.3200 [1]
Naugatex J-8535	.3000 [1]
Pliolite 2000	.2775 [2]
Pliolite 2001	.2775 [2]
Pliolite 2076	.2900 [2]
Pliolite 2104	.3200 [2]
Pliolite 2105	.3200 [2]
Pliolite 2107	.3200 [2]
Pliolite 2108	.3000 [2]
S-2000 and S-2006	.2600 [2]
S-2101	.2600 [2]
S-2105	.2800 [2]
S-2108	.2900 [2]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 673	.5000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.8000 [2]
Thiokol Type WD-2	1.2500 [2]
Thiokol Type WD-6	.8000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

Suppliers are your Materials Listed in the Market Prices Section?
If not, forward full information to —
Market Editor

RUBBER AGE

101 West 3st Street • New York , New York

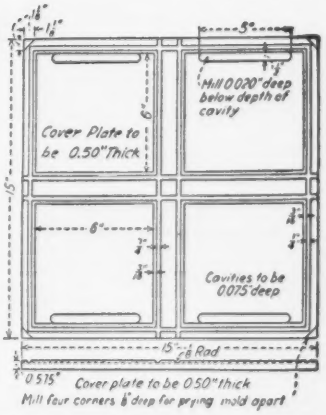
HOGGSON TOOLS, MOLDS, DIES

For Rubber Testing and Production

"DUMBELL" Test Strip Die D412(5IT)

For making tensile test samples, we make many types of slab molds. One is detailed at the right. These are plain or chrome finished. We usually stock molds for making adhesion, abrasion, flexing, compression and rebound test samples, but supply special molds promptly. We also furnish hand-forged tensile dies for cutting regular or tear test samples.

SLAB MOLD D15-55


Mill 0.020" deep below depth of cavity
Cover Plate to be 0.50" Thick
Cavities to be 0.075 deep
0.515"
Cover plate to be 0.50" thick
Mill four corners 6" deep for prying mold apart

HOGGSON & PETTIS MFG. CO., 141A Brewery St., New Haven 7, Conn.

Pac. Coast: H. M. Royal, Inc., Downey, Calif.

MARKETS

(continued)

Reclaimed Rubber

The Rubber Manufacturers Association reports that in the first eight months of this year a total of 204,828 long tons of reclaimed rubber were produced in the United States compared with the 201,250 long tons produced in the first eight months of the previous year.

RMA also advises that in the first eight months of this year, 192,393 long tons of reclaimed rubber were consumed, against the 193,542 long tons in the comparable period of the preceding year.

It will be seen that 1960 is likely to be another 1959 in terms of both production and consumption. It will be remembered that in 1959, something over 300,000 long tons were produced and 286,000 long tons consumed. Prices remain stable. Current quotations follow:

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11½
First Line Whole Tire	.11
Second Line Whole Tire	.10½
Third Line Whole Tire	.10¼
Fourth Line Whole Tire	.09¼
Black Carcass	.15¼
No. 1 Light Colored Carcass	.22
No. 1 Peel	.11
Butyl Tube Reclaim	.14
Natural Rubber Black Tube	.16
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Activity in the scrap rubber market during the past few weeks has been generally described as routine. Mixed automobile tires remain unchanged. There were some softer spots noticeable in the scrap tube section. Reclaimers have resumed activities after usual vacation shut-downs, but there has not been any upswing in activity which would have any significant bearing upon the scrap rubber market.

The Rubber Manufacturers Association reports that a total of 188,165 long tons of scrap rubber were consumed in the United States in the first eight months of this year. At this consumpion rate, year-end totals should approximate 280,000 long tons. Current prices follow:

(Prices Delivered Akron)

Mixed tires	ton	15.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	28.00
No. 3 peelings	ton	23.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	22.00
Passenger S.A.G.	ton	20.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.07
Butyl Rubber Tubes	lb.	.08¼

Tire Fabrics

The competitive battle between rayon and nylon tire yarn producers continues along its price reducing lines. Rayon tire cord producers, who last year slashed prices as much as 16.6 per cent in competition with nylon cord, have made further reductions of from 4½ to 5 per cent. The rayon price cuts of 2½c a pound were originally planned as a temporary move for August shipments only. However, in view of the 2 to 5c price reductions announced by DuPont, Allied Chemical and Chemstrand, the reduced rayon yarn prices stayed in effect beyond August and September of the current year.

Increases Nylon Production

With nylon yarn steadily gaining on rayon yarn in the fight for the $300 million tire yarn market—nylon sales for 1960 are estimated at 150 million pounds compared to 29 million pounds in 1954—two producers announced plans for increasing nylon production.

The National Aniline Division of Allied Chemical Corp. is expanding its Chesterfield, Va., facilities to increase the production of caprolactam polymer and Golden Caprolan nylon tire yarn. According to James G. Fox, Jr., division president, the expansion of the Chesterfield facilities will allow the company to almost triple the present capacity for both caprolactam polymer and Caprolan nylon.

Celanese Mexicana, S.A., an affiliate of Celanese Corporation of America, reports that it will start producing nylon tire cord during the first quarter of 1961, with facilities for a capacity of 2,000 tons yearly. The tire cord will be produced at the Celanese plant in Toluca. Celanese Mexicana has made arrangements with Firestone Tire & Rubber Co., for the process and equipment design and for continuing technical assistance.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.62½
1650	lb.	.62
2200	lb.	.62½

Nylon Tire Cord

210	lb.	1.75
840	lb.	1.47

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.72
11.65 oz. (per square yard)	lb.	.66
14.4 oz. (per square yard)	lb.	.75

Liquid Latex

Natural: Imports of natural latex in the first eight months of the current year totaled 37,578 long tons, considerably less than the 53,753 long tons imported in the first eight months of the preceding year. As for consumption, in the first eight months of this year a total of 34,748 long tons of natural latex were consumed. This compares with the 49,186 long tons consumed in the first eight months of 1959.

Natural rubber latex is currently selling at a 42-43c level at East Coast ports. It is this matter of price, more than anything else, which has contributed to the relatively poor showing that natural latex is making this year.

A recent technological advance, the treatment of natural rubber latex by radiation to custom tailor it for a variety of applications, may provide some breakthrough in increasing consumption. At this point, however, there is nothing on the horizon to indicate that consumption of natural rubber latex will increase in the remaining months of the current year.

Synthetic: Synthetic latex continues to do very well. In the first seven months of this year, 63,937 long tons were consumed, against the 60,961 long tons consumed in the first eight months of 1959. Synthetic is obviously gaining at the expense of its natural counterpart. There is nothing at this point to indicate that this trend will not continue and perhaps even expand. Before another year rolls by, definite patterns will have been established which will be very difficult to break.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 20 points since our last report (September 1), high for the period being 32.45c, reached on September 1 through 15, and low being 32.25c reached on September 29 and 30. The average price of middling uplands for the month of September was 32.39c based on 21 trading days. This compares with an average of 32.59c in the previous month.

Howard Stovall, president of the Cotton Council International, has assured world cotton trade leaders that the 1961 American cotton crop would be of better quality than during the past few seasons.

Addressing a recent conference, Mr. Stovall attributed many complaints now being heard from foreign users of American cotton to the abnormal system of diverting a large percentage of the crop through loan and purpose programs of the United States Government.

"We are optimistic that the 1961 crop will be marketed through normal trade channels and that the character as well as the grade and staple again will influence price in primary markets, which will consequently influence producer practices," he said.

THE CASE OF THE
Customer's Curse
I DON'T GIVE A @!X-#* ABOUT YOUR PROBLEMS WITH CONTAMINATED SOLVENT...YOU MEET YOUR DELIVERY DATES FROM NOW ON OR I'LL CANCEL YOUR @:+!!! CONTRACT!
ONE MORE PRODUCTION HOLD-UP CAUSED BY CONTAMINATED SOLVENT AND YOU'RE THROUGH!!
I THINK I'VE FOUND THE ANSWER, BOSS...SKELLYSOLVE! LES WEBER IS HERE RIGHT NOW!
PURCHASING AGENT
YOU CAN FORGET YOUR PROBLEMS WITH CONTAMINATED SOLVENT WHEN YOU USE SKELLYSOLVE, AND...
...YOU WON'T HAVE ANY TROUBLE WITH LATE DELIVERY, EITHER! HERE'S WHY:
1. Orders phoned direct to Skellysolve plant.
2. 9 out of 10 cars shipped next day.
3. Shipping information sent promptly.
4. Skellysolve is quality-checked during production and before shipping.
5. Technical service backed by over 25 years of Skelly experience.
...LIKE YOU TO MEET THE YOUNG MAN WHO SOLVED OUR PRODUCTION PROBLEM!
SURE GLAD I GOT WISE TO SKELLYSOLVE!
LATER
PURCHASING AGENT

Many companies in your industry depend on Skellysolve for exacting quality, prompt shipment, and expert technical service. Get more complete facts by writing or calling us today at LOgan 1-3575, Kansas City, Missouri.

Skellysolve for Rubber and Related Industries

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor, in dried compound. Closed cup flash point about -25°F.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B. Closed cup flash point about 13°F.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about -16°F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12°F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about -25°F.

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Industrial Division:
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MARKET PRICES

CHEMICALS & COMPOUNDING INGREDIENTS

OCTOBER 1, 1960

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*Trademark. †For Export Only.

The arrangement of this section closely follows the Chemical Section of the 1959 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.74	.81
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	——	1.25
Accelerator—49*	lb.	.60	.61
Accelerator 108*	lb.	——	.92
Accelerator—552*	lb.	——	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	——	.92
Altax*	lb.	.54	.56
Amax*	lb.	.75	.77
No. 1*	lb.	.71	.73
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	——	1.07
Ancazide ET*(†)	lb.	——	1.07
ME*(†)	lb.	——	1.14
Arazate*	lb.	——	2.25
Arquad 12*	lb.	.55	.61
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	——	3.00
Butazate 50D*	lb.	.87	.89
Butyl Eight*	lb.	1.10	1.35
Butyl Namate	lb.	.45	.50
Captax*	lb.	.44	.46
C-P-B*	lb.	——	1.95
Cumate, Rodform*	lb.	——	1.45
Cydac*	lb.	.71	.73
Delac S*	lb.	.71	.73
DIBS*	lb.	——	.85
Diorthotolyguanidine	lb.	.69	.70
Dipac*	lb.	——	.85
Diphenylguanidine	lb.	.51	.52
Dithiocarbamates			
Cyzate B & E	lb.	.85	.89
El-Sixty*	lb.	.62	.69
Ethazate*	lb.	——	1.04
50D*	lb.	.87	.89
Ethyl Thurad*	lb.	——	1.04
Ethyl Tuex*	lb.	——	1.04
Ethylac*	lb.	.93	.95
Geigy Amines	lb.	.46	.52
Guantal*	lb.	.62	.69
Hepteen Base*	lb.	——	1.85
Kure-Blend MT*	lb.	——	.70
Ledate, Rodform*	lb.	——	1.04
MBT-XXX*	lb.	.55	.57
MBTS Grains*	lb.	.54	.56
Merac*	lb.	.75	1.05
Mercaptobenzothiazol	lb.	.44	.46
Mercaptobenzothiazyl Disulfide	lb.	.54	.56
Mertax*	lb.	.55	.62
Methazate*	lb.	——	1.04
Monex*	lb.	——	1.14
Mono Thiurad*	lb.	——	1.14
2-MT	lb.	.88	.90
NA-22* (for neoprene)	lb.	——	1.05
NOBS No. 1*	lb.	.71	.73
Special*	lb.	.75	.77
O-X-A-F	lb.	.55	.57
Pennac SDB*	lb.	.45	.48
Pentex*	lb.	——	1.24
Flour*	lb.	——	.30
Permalux (Neoprene)*	lb.	——	2.25
Phenex*	lb.	.60	.65
Polyac*	lb.	——	1.85
R-2 Crystals*	lb.	——	4.35
Rotax*	lb.	.55	.57
RZ-50-A* and B*	lb.	.70	1.00
Santocure*	lb.	.71	.73
NS*	lb.	.71	.73
26*	lb.	.75	.77
Selenac* (Ethyl, Methyl)	lb.	——	3.00
Seleram, Ethyl	lb.	——	3.00
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.77	.79
GL*	lb.	1.20	1.30
Tellurac*	lb.	——	1.55
Tepidone*	lb.	.45	.45
Tetrone A*	lb.	——	1.98
Thiate A*	lb.	.88	——
B*	lb.	1.05	1.25
Thiazole ZMBT	lb.	.55	.57
Thiofide*	lb.	.54	.61
Thionex*	lb.	——	1.14
Thiotax*	lb.	.44	.51
Thiram, Ethyl	lb.	——	1.04
Methyl	lb.	——	1.14
Thiurad*	lb.	——	1.14
Thiuram E*	lb.	——	1.04
M*	lb.	——	1.14
Cyuram DS & MS	lb.	1.14	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	——	.90
Tuads* (Ethyl)	lb.	——	1.04
Tuads* (Methyl)	lb.	——	1.14
Tuex*	lb.	——	1.14
Ultex*	lb.	1.15	1.20
Unads*	lb.	——	1.14
Vulcacure NB*	lb.	.45	.45
NS*	lb.	.75	1.05
TMD*	lb.	——	1.14
ZB*, ZE*, ZM*	lb.	.85	.89
Z-B-X*	lb.	——	2.45
Zenite*	lb.	.54	.56
Zenite A*	lb.	.69	.71
Zenite AM*	lb.	.76	.78
Zenite Special*	lb.	.55	.57
Zetax* (uncoated)	lb.	.55	.57
Zimate* (Butyl)	lb.	——	1.04
Zimate* (Ethyl)	lb.	——	1.04
Zimate* (Methyl)	lb.	——	1.04
Zimate Slurry 50% solids content (Butyl, Ethyl & Methyl)	lb.	.85	.89
Ziram, Butyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89
Ziram, Ethyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89
Ziram, Methyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89

ACTIVATORS

Blue Lead Sublimed	lb.	.17	.18
Cottonseed Fatty Acids			
Drew Wecoline C*	lb.	.17¾	.19
Wochem 210* and 211*	lb.	.15¾	.18¾
Fish Oil, Hydrogenated, Fatty Acid			
Century Hydrex 440	lb.	.11½	.14
DAR-S*	lb.	.11½	.14
DAR-HY*	lb.	.14¾	.17¼
Groco 56*	lb.	.11½	.14
Hydrofol Acids*	lb.	.11½	.21½
Hyfac 430*	lb.	.17	.19½
Neo-Fat H.F.O.*	lb.	.14½	.15¾
Neutrex*	lb.	.13¾	.16¼
Stearite*	lb.	.11¾	.14¼
Talene*	lb.	.16¼	.18¾
Wecoline 200*	lb.	.14¾	.16
1000*, 1500*	lb.	.12	.13¼
Wochem 730*	lb.	.11½	.14
731*	lb.	.14¾	.17¼
732*	lb.	.15¾	.18¼
Lime, Hydrated			
Arrowhead*	ton	——	21.00
Marblehead*	ton	——	19.25
Sierra*	ton	——	22.50
Litharge			
Eagle-Pitcher* (c.l.)	lb.	.13¾	——
National Lead*	lb.	——	.13¾
SB*	lb.	——	.18½

ACTIVATORS (Cont'd)

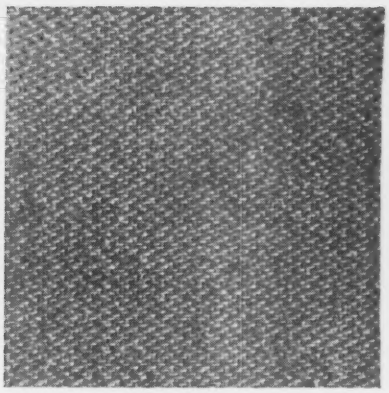
Magnesium Oxide, Heavy			
DCI 601*	lb.	.25¼	——
General Magnesite 500*	lb.	.05½	.06
600*	lb.	.06½	.07
Kaiser 325*	lb.	.03½	.06½
Michigan No. 15*	lb.	.05½	.06½
Morton's Magnesia	lb.	.25¼	——
Magnesium Oxide, Light			
Carey Mag*	lb.	.25¼	.26
DCI Technical*	lb.	.21½	.23½
General Magnesite* (neoprene grade)	lb.	.26¾	.28¾
General Magnesite No 101*	lb.	.24¾	.27¼
Genmeg MLW*	lb.	.25¼	.27¾
Light Calcined Magnesia			
No. X-01*	lb.	.25¼	.26
Maglite D*	lb.	.25¼	——
K*	lb.	.25¾	.27
L*	lb.	.29¾	.30¾
M*	lb.	.27	.28½
Seamag*	lb.	.20	.20½
Marmag*	lb.	.24¾	.26
Michigan No. 30*	lb.	.24¼	.26½
Michigan 1782 Magnesia*	lb.	.25¼	.26½
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
Oleic Acid			
Dar-Chem* 105	lb.	.16¼	.18¾
Drew Wecoline OO*	lb.	.17¾	.19
Emersol 210*	lb.	.16	.18½
Groco Red Oil	lb.	.16¼	.18¾
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	.16¼	.18¾
Palm Fatty Acids			
Groco 48*	lb.	.15¾	.18¼
Neo-Fat*	lb.	.15¾	.17¾
Wochem 280*	lb.	.15¾	.18¼
281*	lb.	.16¼	.18¾
Potassium Oleate (dms.)	lb.	.48	.73
Drew 24%*	lb.	.20	.73
Red Lead			
Eagle-Picher* (c.l.)	lb.	.14¼	——
National Lead*	lb.	.14¼	.14¾
No. 2 RM*	lb.	——	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.47	.72
Stearic Acid, Single Pressed			
Century 1210*	lb.	.15¼	.17¾
Emersol 110*	lb.	.14¾	.17¾
Neo-Fat 18-53*	lb.	.14¾	.16¾
Dar-Chem 11*	lb.	.15¼	.17¾
Stearic Acid, Double Pressed			
Century 1220*	lb.	.15¾	.18¼
Dar-Chem 12*	lb.	.15¾	.18¼
Emersol 120*	lb.	.15¾	.17¾
Groco 54*	lb.	.15¾	.18¼
Neo-Fat 18-54*	lb.	.15¼	.17¼
Stearic Acid, Other			
Century 1230*	lb.	.17½	.20
1240-Supra*	lb.	.17½	.20
Extra Pearlstearic*	lb.	.17½	.20
Neo-Fat 18*	lb.	.18½	.20½
18-58*	lb.	.14¼	.16¼
18-61*	lb.	.16¼	.18¼
Stearex*	lb.	.11¾	.13
Stearite*	lb.	.11¼	.13¼
Wecoline 300*	lb.	.15¼	.16½
Wochem 720*	lb.	.10¾	.13½
721*	lb.	.10¾	.13¼
White Lead Basic Carbonate	lb.	.18	.19
White Lead Basic Sulfate	lb.	.17	.18
Zinc Laurate Laurex*	lb.	.37	.39
Zinc Stearate	lb.	.41	.46
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.36	.44

Unclassified Activators

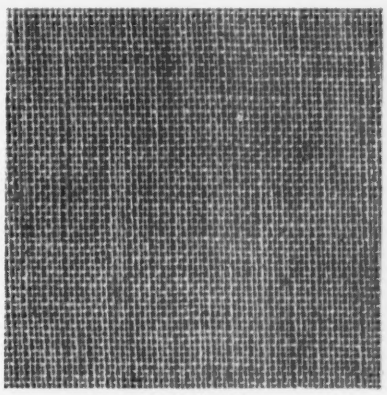
Aktone*	lb.	.21¼	.23½
Barak*	lb.	——	65
Curade*	lb.	.57	.59
DCI Magnesium Carbonate*	lb.	.11	——
Dibenzo G-M-F	lb.	——	2.60
D-B-A*	lb.	——	1.95
G-M-F*	lb.	——	2.60
Dibutylamine (dlvd.)	lb.	.55½	.56½
MODX*	lb.	.38	.40
Neo Fat 42-07*	lb.	.10¾	.12¼
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.18½	.21
Vimbra	lb.	.32	.38½
Vulklor*	lb.	.88	.98

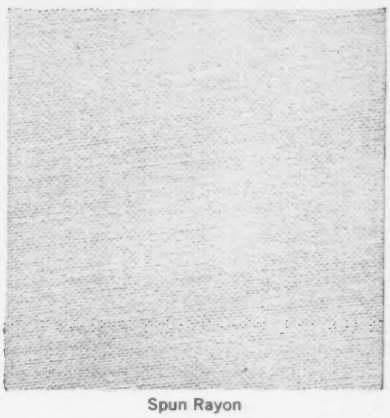
ANTI-COAGULANTS

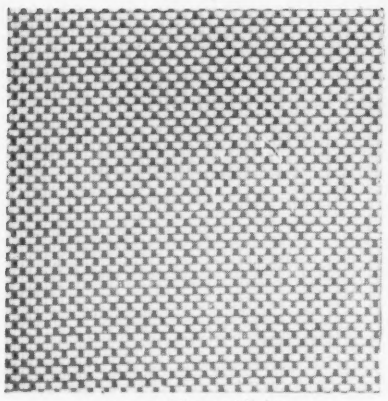
Aqua Ammonia* (dms.)	lb.	.031	.035
M B M C* (l.c.l.)	lb.	.54	.76


Cotton Broken Twill

Spun Dynel


Cotton Chafer


Spun Rayon


Welkote Filament Nylon

Knit Kote

Lantuck

Shown here is just a tiny sample of the many quality base fabrics offered by Wellington Sears for both plastic and rubber coating. The entire selection is more complete and up-to-the-minute than can be found anywhere else in the textile industry.

There are wovens, non-wovens and knits in cotton and synthetics for every coating application. All are continuously proving themselves—in a variety of uses ranging from air-supported domes and collapsible fuel tanks to luggage, upholstery and garments.

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ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	—	**.20**
Regular*	lb.	—	.12
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	4.85	5.95
Antifoam A Emulsion*	lb.	1.78	2.58
Antifoam AF Emulsion*	lb.	1.78	2.58
Antifoam B*	lb.	.59	1.06
Defoama W-1701*	lb.	—	.12½
Defoamer A-25*	lb.	—	**3.00**
Defoamer 630*	lb.	—	.14
Deltyl Prime	lb.	.70	.80
Foamnix*	lb.	.60	1.50
G-E Antifoam SS-24*; 66*	lb.	5.28	6.65
60 Emulsion*	lb.	2.05	3.75
Igepol CO-210	lb.	—	.36
Kessco X-3* (dms.)	lb.	—	.39
X-180*	lb.	—	.28
X-181*	lb.	—	.36½
Nopco 1407*	lb.	.20½	.22½
1497-V*	lb.	.15¼	.17¼
1907-B*	lb.	.22½	.25
JMK*	lb.	.48½	.51
JMU*	lb.	.23¼	.25¾
JMY*	lb.	.23¼	.23½
NDW*	lb.	.21½	.24
Pluronic L61*	lb.	.33½	.39
RS-968*	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52½	.53½
UC SAG 47*	lb.	4.85	6.25
470*	lb.	.61	1.10
VL-520*	lb.	2.68	3.50

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.40	2.50
Gel*	lb.	.70	.72
Hipar*	lb.	1.05	1.07
H.P.*	lb.	.79	.81
Powder*	lb.	.57	.59
Resin*	lb.	.88	.90
Resin D*	lb.	.57	.59
Spar*	lb.	.57	.59
Stalite & Stalite S*	lb.	.57	.59
Superflex*	lb.	.57	.59
Superlite*	lb.	.57	.59
White*	lb.	1.50	1.60
Akroflex C* Pellets	lb.	.85	.87
CD*	lb.	.79	.81
Aminox*	lb.	.57	.59
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.59	.61
Aranox*	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special*	lb.	.94	.96
B-L-E*	lb.	.57	.59
Catalin CAO No. 1*	lb.	.57	.60
CAO No. 3*	lb.	.65	.68
CAO No. 5*	lb.	1.49	1.50
CAO No. 6*	lb.	—	3.50
Dalpac 4	lb.	.57	.60
Deenax*	lb.	.57	.60
Diphenylamine	lb.	.31	.33
Di-tert-Butyl-para-Cresol*	lb.	.86	1.16
DBPC*	lb.	.54	.60
Eugenol C-95%*	lb.	2.30	2.50
Flectol H*	lb.	.57	.64
Flexamine*	lb.	.79	.81
Ionol*	lb.	.57	.60
Naugawhite*	lb.	.57	.59
Powder*	lb.	.57	.59
Neozone A*	lb.	.64	.66
C*	lb.	.86	.88
D*	lb.	.57	.59
Nevastain A*	lb.	.51	.61
B*	lb.	.51	.70
Nullapon BF-12*	lb.	—	.21½
BF-13*	lb.	—	.25½
BF-78*	lb.	—	.55
BF-Acid*	lb.	—	.85
Octamine*	lb.	.57	.59
Oxidex*	lb.	—	3.60
PDA-10*	lb.	.46	.48
Pennox* A, B, C, D	lb.	.57	.72
Permalux*	lb.	—	2.25
Polygard*	lb.	.57	.59
Santoflex AW*	lb.	.71	.78
DD*	lb.	.57	.64
75*	lb.	1.01	1.08
Santovar-A*	lb.	1.55	1.62
Santowhite Crystals*	lb.	1.55	1.62
Santowhite L*	lb.	.57	.64
MK*	lb.	1.25	1.32
Powder*	lb.	1.55	1.62
Sequestrene AA*	lb.	.70	.80
NA2*	lb.	.59	.66
NA3T*	lb.	.54	.61
Sodium Nitrate	cwt.	8.75	11.00
Stabilite*	lb.	.57	.59
Alba*	lb.	.75	.80
FLX*	lb.	.78	.80
L*	lb.	.65	.67
White*	lb.	.57	.59
White Powder*	lb.	.46	.48
Stabilizer No. 1*	lb.	1.55	1.80
Stabilizer No. 9-A*	lb.	.80	1.05
Styphen I*	lb.	.51	.55
Sunolite*	lb.	.16	.22
Tecquinol*	lb.	.82½	.84½
Tannic Acid, Tech.	lb.	.46	.48
Tenamene 3*	lb.	.57	.60
Thermoflex A*	lb.	1.05	1.07
Wing-Stay S*; T*	lb.	.56	.67
Zalba*	lb.	—	1.10
Special*	lb.	—	.85

ANTIOZONANTS

Eastozone* 32*	lb.	1.15	1.18
Flexzone 3C	lb.	—	2.00
6-H	lb.	1.25	1.27
Fura-Tone NC-1008*	lb.	.28	.39
NC-1012*	lb.	.46	.69
Santoflex AW*	lb.	.71	.78
UOP 88* & 288* (dms).	lb.	1.05	1.07
Wing-Stay 100*	lb.	1.00	1.08

ANTI-SCORCHING AGENTS

Akron Benzoic Acid	lb.	.41	.43
Armeen HT*	lb.	.34	.40
Good-rite Vultrol*	lb.	.67	.70
Harcopol 1183*	lb.	.70	.74
Retarder PD*	lb.	.37	.39
W*	lb.	—	.46
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32	.38
Arquad S*	lb.	.38	.44
Formaldehyde (dms.)	lb.	.06	.076
G-4* (bbls.)	lb.	1.09	1.29
G-11*	lb.	1.98	2.08
Halane*	lb.	.40	.47
Irgason BS200*	lb.	2.50	2.75
Ortho Cresol (26°—27°)	lb.	.15	.16
Preventol GD	lb.	—	1.09
Retarder D*	lb.	.42	.50

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	4.70	5.80
Webnix 34-L*	lb.	1.25	1.75
57*; 69C*	lb.	1.50	2.00
71*	lb.	1.25	1.75

AROMATICS (DEODORANTS)

Airkem 115*	gal.	—	6.50
122*; 186*	gal.	—	6.50
Alamask AA*	lb.	—	**3.00**
AF*	lb.	—	**2.50**
AO*	lb.	—	**1.50**
AR*	lb.	—	**.50**
BG*	lb.	—	**1.15**
BGM*	lb.	—	**.60**
CY*	lb.	—	**2.40**
DJ*	lb.	—	**3.35**
DL*	lb.	—	**1.95**
H*	lb.	—	**5.50**
LD*	lb.	—	**.75**
ND*	lb.	—	**2.75**
O*	lb.	—	**6.50**
OS*	lb.	—	**5.25**
Bouquet 149*	lb.	—	**3.00**
Coumarin*	lb.	—	**3.70**
Deodorant 65*	lb.	—	**1.85**
Deodorant L-37*	lb.	2.15	2.25
L-44*	lb.	2.65	2.75
N.L.T.X.*	lb.	1.90	2.00
Deodorant Oil GD 6422*	lb.	1.90	2.20
GD 6423*	lb.	1.60	1.90
GD 6575*	lb.	2.40	2.90
GD 31063*	lb.	2.25	2.75
Ethavan*	lb.	6.20	6.25
Latex Perfume 17326	lb.	—	4.00
18301	lb.	—	3.00
22258	lb.	—	2.50
Naugaromes* (dms.)	lb.	.60	**3.00**
Neutroleum Delta*	lb.	—	**2.25**
Gamma*	lb.	—	**3.25**
Parador A*	lb.	1.80	2.10
C*	lb.	2.00	2.50
E*	lb.	.25	.40
GD 5280*	lb.	2.00	2.50
GD 53481*	lb.	1.70	2.00
Perfume Oil Bouquet Vanilla M*	lb.	1.60	1.70
Rodo No. 0*	lb.	4.00	4.50
No. 10*	lb.	5.00	5.50
Rubbarome* (dms.)	lb.	.60	3.80
Rubber Perfume 12*	lb.	—	**4.35**
Russian Leather 7*	lb.	—	**4.35**
Vanillin	lb.	2.75	2.80

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—	9.00
Better Blend Soda* (c.l., bags)	cwt.	—	2.70
B-I-K	lb.	.20	.22
Blowing Agent No. 81105	lb.	.32	.35
Celogen*	lb.	—	1.95
AZ*	lb.	1.92	1.94
80	lb.	—	1.60
Diazo Amino Benzene	lb.	—	.73
Kempore R-125	lb.	—	1.92
Neo Fat 42-12*	lb.	.10¼	.12¼
Opex 40	lb.	—	.72
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	2.55
Unicel ND*	lb.	—	.72
S*	lb.	—	.20
Urea	lb.	.06	.07

BONDING AGENTS

Base 6986*	lb.	.27	.32
Braze*	gal.	6.00	**9.00**
Braze Cover Cement*	gal.	2.50	4.00
Chemlock 201, 203	gal.	5.00	7.50
220	gal.	8.95	12.00
401	gal.	5.00	24.00
607	gal.	18.00	24.00
614	lb.	4.35	4.75

BONDING AGENTS (Cont'd)

Durez 12987*	lb.	.47½	.49
EX-B501-4	gal.	6.20	4.90
EX-B150-1	gal.	8.15	11.00
EX-B579-1	gal.	19.40	26.40
Gen-Tac Latex*	lb.	.70	.75
Hylene M*	lb.	1.25	1.50
M-50*	lb.	.80	1.11
Penacolite B1A*	lb.	—	**.95**
R-2710*	lb.	—	**.95**
Plobond 20*	gal.	2.91	**4.23**
30*	gal.	3.65	**4.97**
Rex Compounds*	gal.	1.30	**1.90**
Thixons*	gal.	2.95	9.80
Ty-Ply Q (BN & S)*	gal.	6.75	**8.00**
Tygobond 30*	gal.	4.10	5.40
40*	gal.	5.80	6.89
41*	gal.	8.65	9.85
45*	gal.	5.75	6.48
Vinculux	gal.	—	4.95

COAGULANTS

Acetic Acid—56% (bbls.)	cwt	9.00	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Flake	lb.	.07½	.09½
Hydroxyacetic Acid—70% (dms.)	lb.	—	.09½
Zinc Nitrate, Tech. Flake	lb.	—	.20

COLORING AGENTS

Black

Aquablak B*	lb.	.09¾	.10¾
M*	lb.	.10½	.11
S*	lb.	.11¾	.12¼
Black Shield 4*	lb.	.10	.10½
No. 6	lb.	.11	.11½
No. 17	lb.	.12½	.13
No. 19	lb.	.12	.12½
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10*	lb.	.06	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.14¾	.15
Pure Black Iron Oxide	lb.	.14¾	.15

Blue

Akron Masterbatches*	lb.	2.23	**2.78**
Toners*	lb.	2.30	**6.35**
Blue Powders	lb.	2.20	**3.75**
Cooke M.B. Blue* 426	lb.	2.20	3.75
Cyan Blue GT 55-3295	lb.	—	3.20
XR 55-3760	lb.	—	2.90
XR 55-3770	lb.	—	3.25
Disco Blues	lb.	2.20	3.45
Harmon Blue Toner B-4776	lb.	—	2.90
Monastral Rubber Blue CPL*	lb.	1.95	1.95
PCD, Dispersed*	lb.	—	2.55
Peacoline Blue*	lb.	—	**3.85**
Ramapo Blue*	lb.	2.75	**3.00**
Rubber Blue GD* (Disp.)	lb.	—	**4.75**
Rubber Blue X-1999*	lb.	—	**1.90**
Rubber Dispersed Blues	lb.	2.52	**2.78**
Solfast Blue*	lb.	1.60	3.25
Stan-Tone MBS*	lb.	2.20	**2.92**
GPE*	lb.	2.25	2.75
PEC*	lb.	1.95	2.10
Ultramarine	lb.	.14	**.30**
Vansul Blue M.B.*	lb.	1.00	2.70

Brown

Brown Iron Oxide	lb.	.15¾	.16
Mapico Brown* (50 lb. bags)	lb.	.15¾	**.16**
Stan-Tone GPE*	lb.	—	**3.00**
Vansul Brown M.B.* (Organic)	lb.	—	**2.30**

Green

Akron Masterbatches*	lb.	1.53	3.08
Toners*	lb.	1.50	4.35
Chromium Oxide	lb.	.44½	.45¼
Cooke M.B. Green*	lb.	1.60	**2.80**
413*	lb.	—	2.80
Cyan Green 15-3100	lb.	—	3.35
Disco Greens	lb.	1.55	2.80
Green Powders	lb.	1.35	**3.95**
Harmon Green Toner G-5056	lb.	—	3.95
Hi-Fiz Fluorescent	lb.	1.60	2.60
Monastral Rubber Green GSD* (Dispersed)	lb.	—	**2.80**
GSL*	lb.	2.20	**2.20**
Permansa Green CP-1236*	lb.	—	1.45
Pigment Green B*	lb.	1.45	1.50
GL-652D*	lb.	.90	.95
Ramapo Green*	lb.	—	**3.50**
Rubber Dispersed Greens	lb.	1.23	**3.08**
Rubber Green FD* (Disp.)	lb.	—	**2.05**
Rubber Green X-1292*	lb.	—	1.75
Serene Green*	lb.	—	3.50
Solfast Green*	lb.	1.60	3.35
Stan-Tone MBS*	lb.	2.50	**3.42**
GPE*	lb.	1.50	1.70
PC*	lb.	2.20	2.25
Vansul Green M.B.*	lb.	1.50	2.75

Maroon

Akron Masterbatches*	lb.	3.53	4.38
Toners*	lb.	.98	5.60
Harmon Maroon Toner MV-6606	lb.	—	**5.75**
Pyrolux Maroon*	lb.	—	**3.40**
Vansul Maroon M.B.*	lb.	—	**4.05**

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FLEXIBLE URETHANE FOAMS

Bring lower production costs to you, superior quality to your customers

Reduced production costs. Du Pont "Freon", as an auxiliary blowing agent, now permits you to *control* the density of your flexible urethane foams. Result—you can produce a greater volume of urethane foam from the same amount of raw materials.

Improved foam quality. By controlling foam density, you can now provide customers with urethane foams that meet their cushioning needs more closely —foams that are softer and more resilient, foams that permit thinner cushioning. Yet you provide all of the other physical advantages of urethane foams to customers in the furniture, bedding, carpet and automotive industries.

For more information on how "Freon" blowing agents can help you produce greater volumes of higher-quality urethane foams, write: E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Division, N-2420, Wilmington 98, Delaware.

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BLOWING AGENTS

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

COLORING AGENTS (Cont'd)

Orange

Akron Masterbatches*	lb.	2.53	- 2.98
Toners*	lb.	2.97	- 4.30
Benzidene Orange	lb.	—	- 3.30
Cooke MB*	lb.	2.25	- 2.35
425*	lb.	—	- 2.25
Dianisidine Orange*	lb.	—	- 2.85
Disco Oranges	lb.	2.30	- 2.85
Harmon Diane Orange Toner Y-25	lb.	—	- 2.85
Pyrazolone Orange Toner YB-3	lb.	—	- 3.30
Hi-Fiz Fluorescent	lb.	1.40	- 2.40
Mercadium X-2667*	lb.	—	- 1.65
Molybdate Orange	lb.	—	- .49
Oswego Orange X-2065*	lb.	—	- 3.30
Rubber Orange OD* (Disp.)	lb.	—	- 2.25
Stan-Tone Cadmium Dry*	lb.	1.85	- 4.28
Cadmium Paste*	lb.	2.43	- 2.85
GPE*	lb.	1.05	- 1.20
PC*	lb.	.75	- .80
Vansul Orange M.B.*	lb.	2.30	- 2.65

Red

Akron Masterbatches*	lb.	1.30	- 3.68
Toners*	lb.	.98	- 5.60
Arcturus Reds*	lb.	—	- 1.35
Antimony Trisulfide	lb.	.72	- .78
R.M.P. Sulfur Free*	lb.	—	- .78
R.M.P. No. 3*	lb.	—	- .72
Bonadur 20-6440	lb.	—	- 1.90
20-6540	lb.	—	- 2.00
Brilliant Toning Reds*	lb.	1.77	- 1.90
Cadmolith Red* (dms.)	lb.	1.94	- 2.87
Clarion 20-7150	lb.	—	- 1.35
Cooke M.B. Red*	lb.	1.05	- 3.25
410*	lb.	—	- 1.75
Disco Reds	lb.	1.05	- 3.25
Graphic Red* (dlvd.)	lb.	.98	- 1.03
Harmon Electra Red Toner	lb.	—	- 3.45
Lithol Rubine Toner R-6142	lb.	—	- 1.60
Pyrazolone Red Toner	lb.	—	- 1.40
Rincon Red Tones	lb.	—	- 1.90
Hi-Fiz Fluorescent	lb.	1.15	- 2.15
Kroma Reds*	lb.	.14¼	- .14½
Lake Red C*	lb.	—	- 1.25
Mapico Reds* (50 lb. bags)	lb.	.14¼	- .14½
Mercadium X-2668 Light*	lb.	—	- 1.72
X-2669 Medium Light*	lb.	—	- 1.80
X-2670 Medium*	lb.	—	- 1.87
X-2671 Dark*	lb.	—	- 1.95
Naphthol 20-7575	lb.	—	- 3.80
Oximony Red Iron Oxide	lb.	.14¼	- .14½
Plasticone Red*	lb.	1.02	- 4.60
Polaris Red*	lb.	—	- 1.70
Recco Red Oxide*	lb.	.13½	- .13¾
Red Iron Oxide, Light	lb.	.14¼	- .14½
Red Powders	lb.	—	- 4.40
Rubber Dispersed Reds	lb.	1.47	- 3.58
Rubber Red PBD* (Disp.)	lb.	—	- 2.05
2BD, Dispersed*	lb.	—	- 2.00
2BL*	lb.	1.24	- 1.24
PBL*	lb.	1.24	- 1.24
Rubanox Reds*	lb.	1.47	- 1.60
Rubber Red CP-339* (dlvd.)	lb.	—	- 1.10
Rubber Red X-1148*	lb.	—	- .98
Solfast Red*	lb.	1.47	- 1.80
Stan-Tone MBS*	lb.	1.00	- 3.75
GPE*	lb.	.70	- 3.05
PC*	lb.	1.10	- 1.45
Vansul Red M.B.*	lb.	1.00	- 3.35
Watchung Red*	lb.	1.90	- 1.90

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.23¼	- .23½
20* (50 lb. bags)	lb.	.23¼	- .23½

White—Lithopone

Permolith*	lb.	.0825	- .09125
Sunolith*	lb.	.0800	- .0875

White—Titanium Pigments

Iceberg*	lb.	—	- .0265
Icecap K*	lb.	—	- .03¼
Horse Head Anatase Grades*	lb.	.25½	- .26½
Rutile Grades*	lb.	.27½	- .28½
Stan-Tone PC*	lb.	.55	- .60
Ti-Cal*	lb.	.09	- .09¾
R-22*, R-25*, R-27*, R-30*	lb.	.09⅜	- .09⅞
R-60*	lb.	.09⅜	- .10⅛
Ti-Pure*	lb.	.24½	- .27½
Anatase Grades*	lb.	.25½	- .26½
R-100*, R-500*	lb.	.27¼	- .28½
Titanox A*—all grades (dlvd.)	lb.	.25¼	- .26½
C-50* (dlvd.)	lb.	.14⅜	- .14⅞
RA* (dlvd.)	lb.	.27½	- .28½
RA-10* (dlvd.)	lb.	.27½	- .28½
RA-NC* (dlvd.)	lb.	.27½	- .28½
RC* (dlvd.)	lb.	.09⅝	- .10⅛
RC-HT* (dlvd.)	lb.	.09⅜	- .09⅞

COLORING AGENTS (Cont'd)

White—Titanium Pigments (Cont'd)

Unitane O-110*	lb.	.25½	- .26½
O-220*	lb.	.25½	- .26½
O-310*	lb.	.25½	- .26½
OR-150*	lb.	.27½	- .28½
OR-250*	lb.	.27½	- .28½
OR-340*	lb.	.27½	- .28½
OR-342*	lb.	.27½	- .28½
OR-350*	lb.	.27½	- .28½
OR-540*	lb.	.27½	- .28½
OR-640*	lb.	.27½	- .28½
Zopaque*	lb.	.24½	- .25½
R*	lb.	.26½	- .27½

White—Zinc Oxide (American Process)

AZODOX 44, 45	lb.	.1450	- .1550
AZO-ZZZ 11*, 22*, 33*, 44* 55*	lb.	.1450	- .1550
Eagle-Picher AAA*	lb.	.1450	- .1550
Horse Head Special*	lb.	.1450	- .1550
XX*	lb.	.1450	- .1550
Protox 166*	lb.	.1450	- .1550
167*	lb.	.1450	- .1550
267* (pelleted)	lb.	.1450	- .1550
St. Joe Black Label* 20, 20-21	lb.	.1450	- .1550
Red Label* 30, 31	lb.	.1450	- .1550
Green Label* 12, 46 (latex only)	lb.	.1450	- .1550
Green Label* 42, 42-21, 42A-3, 43 Pelets	lb.	.1450	- .1550

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	- .13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450	- .1550
Florence Green Seal*	lb.	.1625	- .1725
Red Seal*	lb.	.1575	- .1675
White Seal*	lb.	.1675	- .1775
Kadox 25*	lb.	.1500	- .1600
15*, 17*, 72* & 515	lb.	.1450	- .1550
Protox 168*	lb.	.1450	- .1550
169*	lb.	.1450	- .1550
268* (pelleted)	lb.	.1450	- .1550
U.S.P. (cartons)	lb.	.1775	- .1875
XX-78*	lb.	.1450	- .1550

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	- .2630
Lehigh 12%*	lb.	.1250	- .1350
18%*	lb.	.1400	- .1500
35%*	lb.	.15375	- .16375
50%*	lb.	.1575	- .1675

Yellow

Akron Masterbatch*	lb.	1.27	- 2.48
Toners*	lb.	2.20	- 6.00
Benzidene-Lightfast	lb.	3.40	- 5.35
Benzidine Yellow	lb.	1.41	- 2.55
Cadmolith Yellow (dms.)	lb.	—	- 1.19
Chrome Yellow	lb.	.35	- .35
Cooke M.B. Yellow 405*	lb.	2.15	- 2.75
Disco Yellows	lb.	2.05	- 3.95
Harmon Benzidene Yellow Toner YB-2	lb.	—	- 2.25
Fanchon Yellow Toner	lb.	—	- 2.20
Hi-Fiz Fluorescent	lb.	1.60	- 2.60
Iron Oxide, Pure Light Shades	lb.	.12½	- .12¾
Dark Shades	lb.	.12	- .12¼
Mapico Yellow* (50 lb. bags)	lb.	.12	- .12¼
Rubber Dispersed Yellows	lb.	1.27	- 2.13
Rubber Yellow GD* (disp.)	lb.	—	- 2.25
GL*	lb.	—	- 1.68
Rubber Yelow X-1940*	lb.	—	- 2.25
Stan-Tone Cadmium Dry*	lb.	2.80	- 3.03
Cadmium Paste	lb.	1.72	- 1.82
MBS*	lb.	1.30	- 2.20
GPE*	lb.	.70	- 3.25
PC*	lb.	.55	- 3.50
Toluidine Yellow	lb.	2.20	- 2.20
YL-660 D*	lb.	1.25	- 1.35
Oximony Iron Oxide	lb.	.14¼	- .14½
Vansul Yellow M.B.*	lb.	1.15	- 2.15
Yellow Powders	lb.	2.00	- 5.00
Zinc Yellow	lb.	.29	- .29

DISPERSING AGENTS

Anchoid*(†)	lb.	.24	- .25
Anhydrapent*	lb.	.56	- .59
Armeen 18*	lb.	.39	- .45
Belloid TD*	lb.	.15¾	- .16¼
Blancol*	lb.	—	- .15¾
Darvan No. 1*, No. 2*, No. 3*	lb.	.22	- .35
No. 6*	lb.	.15¼	- .15¾
No. 7*	lb.	.18¾	- .23¾
Daxad 11* (21*, 23*)	lb.	.08	- .30
Diethanolamine (dms., dlvd.)	lb.	.24½	- .27
Dispersaid*	lb.	1.25	- 1.35
Emcol K-8300* (dms.)	lb.	.14	- .18
P10-59	lb.	.32	- —
5120	lb.	.31	- —
5138	lb.	.31	- —
Emulphor ON-870*	lb.	—	- .55
Furala*	lb.	.06½	- .07½
Halloid*	lb.	.04½	- .05½
Igepal CO-630*	lb.	—	- .29
Igepon T-73*	lb.	—	- .29½
Kyro EO* (dms.)	lb.	—	- .29¼
Leonil SA*	lb.	—	- .55

DISPERSING AGENTS (Cont'd)

Lipal No. 9-N*	lb.	.28	- .29
11-O*	lb.	.28	- .29
Lomar PW*	lb.	.15¼	- .15¾
Marasperse C*	lb.	.06¼	- .06¾
CB*	lb.	.15	- .17
N*	lb.	.09½	- .10½
Monoethanolamine (dms., dlvd.)	lb.	.25	- .27½
Naccosol A (dlvd.)	lb.	—	- .52
Naccotan A*	lb.	.16½	- .17
Nekal BA-75*	lb.	—	- .40
BX-78*	lb.	—	- .64
Nopcosant*	lb.	.15¼	- .15¾
Pluronic F68*	lb.	.38½	- .44
Polyfon*	lb.	.08	- .10
R & R 551*	lb.	—	- .28
Stablex B*	lb.	.50	- .95
Stan-Chem BQC*	lb.	.12¼	- .17¼
1067*	lb.	—	- .13½
1471*	lb.	.1687	- .2187
2251*	lb.	.12¼	- .17¼
Trenamine D-25*	lb.	.32½	- .36
Triethanolamine (dms., dlvd.)	lb.	.22	- .25½
Yelkin TT* (and TTS*)	lb.	.13	- .16

EXTENDERS

Arcco 1294-36B*	lb.	.11½	- .12½
Car-Bel-Ex-A*	lb.	—	- .144
Extender 600*	lb.	—	- .1870
Facile Gum 4A*	lb.	.48	- .50
Mulex*	lb.	—	- .07
W*	lb.	—	- .07
Nopco 2271*	lb.	.16¼	- .18¾
OPD*	lb.	.29	- .40
Polyco 418*	lb.	.17	- .18
PR-162 Latex Extender*	lb.	—	- .182
Solvitose HDF*	lb.	.22	- .25
Synprolac*	lb.	.16	- .23
Synprowax*	lb.	—	- .23
Vanadiset B*	lb.	.0360	- .07
C*	lb.	.0310	- .06
MR* 80 mesh	lb.	.08½	- .12½
Vistanex MM Grades*	lb.	—	- .35
Wilcarbo Carbon Powders*	lb.	.08	- .15

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.21½	- 1.35
Lionite*	lb.	.16	- 1.27
Pumice	lb.	.03	- .05
Walnut Shell Grits	ton	60.00	-110.00
Aluminum Hydrate	lb.	.031	- .170
Kaiser Aluminum Hydrate*	lb.	.035	- .065
Aluminum Silicate			
AFD*	ton	29.50	- 36.00
Aluminum Flake*	ton	29.50	- 36.00
Marter White*	ton	18.50	- 30.00
Barium Carbonate (l.c.l.)	ton	109.00	-126.50
Barytes			
No. 1 Floated, White*	ton	55.00	- 79.85
No. 2 Floated, Unbleached*	ton	50.00	- 74.85
No. 22 Barytes* (c.l.)	ton	—	- 30.00
No. 3805 Barytes*	ton	22.00	- 26.75
Foam A*	ton	60.00	- 84.85
Sparmite*	ton	80.00	- 90.00
XIOR*	ton	90.00	- 95.00
Bentonite (c.l.)	ton	—	- 13.50
Argosite Clay* (c.l.)	ton	—	- 12.50
Bennett Clay* (c.l.)	ton	—	- 32.50
SPV Volclay* (c.l.)	ton	—	- 13.50
White Hi-Gel*	ton	—	- 65.90
Blanc Fixe	ton	125.00	-142.00
Calcium Carbonate			
Allied Whiting	ton	—	- 11.50
Atomite* (c.l.)	ton	32.50	- 35.00
B.I. White No. 1 (c.l.	ton	—	- 10.00
Calcene NC*	ton	80.00	-100.00
TM*	ton	82.50	-102.50
Calwhite*	ton	20.00	- 25.00
T*	ton	25.00	- 30.00
Camel-Carb*	ton	—	- 14.00
Camel-Tex*	ton	—	- 22.00
Camel-Wite*	ton	—	- 35.00
Carbium	ton	30.00	- 40.00
CCO White*	ton	—	- 22.00
Duramite*	ton	20.00	- 22.00
Gamaco* (c.l.)	ton	32.50	- 37.50
T*	ton	37.50	- 42.50
GamaKal*	ton	37.50	- 42.50
Georgia Marble 5-25* (c.l.)	ton	—	- 20.00
No. 10 White* (c.l.)	ton	—	- 11.00
Kalite*	ton	52.50	- 67.50
Kalmac*	ton	23.00	- 28.00
Laminar*	ton	—	- 30.00
Lesamite* (c.l.)	ton	—	- 27.50
Lorite*	ton	30.00	- 36.00
Millical*	ton	38.00	- 53.00
Multifex MM*	ton	117.50	-137.50
Non-Fer-Al*	ton	35.00	- 50.00
Purecal M*	ton	56.75	- 80.75
SC* (and T*)	ton	110.00	-125.00
U*	ton	120.00	-135.00
PPTD* (c.l.)	ton	—	- 30.00
Rambo No. 1*	ton	—	- 11.50
Snowflake*	ton	20.00	- 22.00
Super Multifex*	ton	167.50	-187.50
Surfex*	ton	42.00	- 57.00
Suspenso*	ton	38.00	- 43.00
Witcarb Reg.*	ton	60.00	- 85.00
R*	ton	127.50	-150.00
RC*	ton	117.50	-140.00
York White*	ton	—	- 11.50

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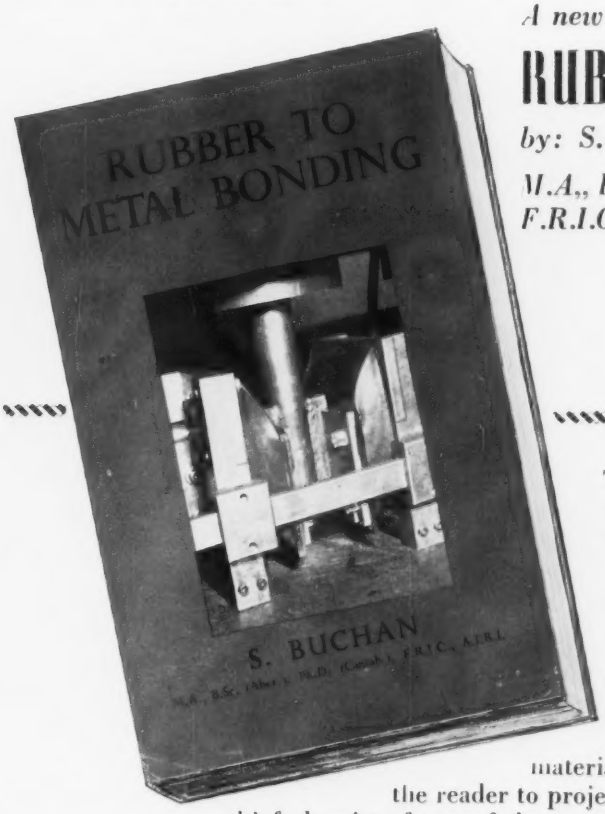

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Calcium Silicate			
Silene EF*	lb.	.06	.06½
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	—	22.00
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	—	17.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	—	35.00
OMYA Whiting*	ton	—	35.00
Clay			
Afton Clay*	ton	13.00	38.00
Aiken Clay*	ton	14.50	—
Akron HC-100*	ton	14.50	—
HC-75*	ton	13.00	—
SC-25*	ton	14.50	—
Alsilite* (c.l.)	ton	30.00	45.00
Aluminum Flake*	ton	25.50	28.50
Barden R*	ton	8.50	13.00
Buca* (c.l.)	ton	—	45.00
Burgess No. 20*	ton	—	33.00
No. 30*	ton	—	40.00
Burgess Iceberg*	ton	—	53.00
Icecap K*	ton	—	65.00
Catalpo* (c.l.)	ton	33.00	—
Champion*	ton	—	14.50
Crown*	ton	—	14.50
Dixie* (c.l.)	ton	—	14.50
Dover*	ton	—	13.00
Franklin Clay—R* (c.l.)	ton	16.00	41.50
G. K. Soft*	ton	11.50	32.00
Glomax HE (bags)	ton	65.00	—
LL (bags)	ton	53.00	—
PVR (bags)	ton	40.00	—
WZ (bags)	ton	45.00	—
Harwick Clays*	ton	21.50	77.00
Hydrite RS (bags)	ton	30.00	—
PXS (bags)	ton	45.00	—
UF (bags)	ton	100.00	—
10S (bags)	ton	50.00	—
Flat "D" (bags)	ton	25.00	—
Hi-White R*	ton	10.00	14.50
Kaolloid Clay* (c.l.)	ton	—	10.50
LGB*	ton	13.00	17.50
LGP*	ton	15.50	20.00
McNamee* (c.l.)	ton	—	14.50
Natka 1200	ton	13.00	36.00
Par* (c.l.)	ton	—	12.00
Paragon*	ton	10.00	14.50
Pigment 5*	ton	27.50	34.50
33*	ton	—	40.00
Polyfil 40	ton	40.00	—
70	ton	53.00	—
80	ton	65.00	—
C	ton	25.00	—
F	ton	45.00	—
X	ton	30.00	—
Recco* (c.l.)	ton	—	14.50
Swanee Clay*	ton	—	12.50
Snobrite*	ton	—	12.50
Suprex*	ton	10.00	14.50
Whitetex* (c.l.)	ton	53.00	—
Windsor*	ton	14.50	39.50
4200 Clay*	ton	13.00	—
Diatomaceous Earth	ton	30.00	50.00
Celatom MN-33	ton	36.00	95.00
MP-25	ton	55.00	-121.00
MP-63	ton	55.00	-121.00
Celite 270	ton	55.00	-121.00
292	ton	36.00	95.00
315; 350	ton	137.00	-225.00
Kaylorite* (c.l.)	ton	—	30.00
Lorite*	ton	—	36.00
Flock			
Cotton (White)	lb.	.28	.30
Colored	lb.	.12	.20
Filfloc F 40-9000*	lb.	—	.13
F 6000*	lb.	—	.36
Nylon	lb.	—	.35
Potycel*	ton	110.00	-210.00
Rayon, Bleached or Dyed	lb.	.75	1.20
Rayon, Grey	lb.	—	.18
Rayon, Pink	lb.	—	.20
Solka-Floc* (l.c.l.)	lb.	.07	.16
Glue, Amber	lb.	.17	.19
Ground Softwood Bark			
Silvacon* (c.l.)	ton	55.00	-100.00
Leather			
Flour (dust)	lb.	.12	.13
Shredded	lb.	.05	.17
Lignin	lb.	.06	.08
Limestone, Pulverized	ton	3.00	5.00
Asbestol Regular*	ton	28.00	—
Asbestol Superfine*	ton	33.00	—
Georgia Marble No. 10*	ton	—	11.00
Industrial Filler No. 100*	ton	—	7.75
Micro Velva A*	ton	53.00	—
L*	ton	61.00	—
No. 1 White*	ton	—	11.00
Magnesium Carbonate	lb.	.10½	.13
K & M Technical* (c.l., eqld.)	lb.	.10½	.12
Marinco CL*	lb.	.11	.13
Michigan*	lb.	.11	.15
Magnesium Silicate (see Talc)			
Mica	lb.	.01¾	.07
Concord*	lb.	.08	.08¾
Micro-Mica*	lb.	.08	.08¾
Mineralite* (c.l.)	ton	40.00	85.00
Silversheen*	lb.	.08	.08½
Triple A Mica* (c.l.)	ton	—	40.00
Vermiculite*	lb.	—	.11
Wet Ground Biotite Mica	lb.	.06½	.07¼
Wet Ground Mica No. 160*	lb.	.08	.08¼

FILLERS (Cont'd)

Pecan Shell Flour			
Stan Shell*	ton	45.00	75.00
Pyrophyllite			
No. 261*	ton	—	11.50
Pyrax A* (c.l.)	ton	14.50	15.00
WA* (c.l.)	ton	17.00	17.50
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
Extra Fine (bags) (c.l.)	ton	—	43.00
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour*	lb.	—	.04½
No. 133 Slate Flour*	ton	—	4.55
Sodium Silico Aluminate			
Zeolex 23*	lb.	.06	.07
Talc (Magnesium Silicate)			
Akron Soapstone*	ton	—	9.75
Asbestol Regular*	ton	—	27.00
Eastern RC-500*	ton	—	32.00
No. 41*	ton	—	19.70
No. 549*	ton	—	63.00
French*	ton	—	59.00
No. 367*	ton	—	13.00
No. 1600*	ton	—	70.60
No. 1768*	ton	—	13.00
Nytal 200* (c.l.)	ton	—	28.00
300* (c.l.)	ton	—	38.00
Sierra Fibrene C-400*	ton	34.00	40.00
Sierra Supreme 325*	ton	51.00	56.00
Sierra White*	ton	21.75	26.75
Soapstone*	ton	—	13.00
Walnut Shell Flour	ton	55.00	-100.00
Agrashell*	ton	55.00	-115.00
Stan-Shell*	ton	50.00	-110.00
Whiting, Commercial	ton	—	7.50
Allied Whiting*	ton	—	11.50
Camel-Carb*	ton	—	10.00
Calwhite (c.l.)	ton	—	20.00
C-C-O White*	ton	—	22.00
Georgia Marble No. 15*	ton	—	20.00
No. 10*	ton	—	20.00
Pigua No. 1 YAA* (c.l.)	ton	10.00	10.00
No. 2 LS* (c.l.)	ton	10.00	10.00
Snowflake* (c.l.)	ton	20.00	22.00
Stan-White 325*	ton	11.50	14.10
Ultrasil*	lb.	.35	.50
Veroc* (c.l.)	ton	—	11.50
Welco* (c.l.)	ton	—	10.50
York White R* (c.l.)	ton	—	11.00
Wood Flour	ton	31.50	48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	2.35
Black Out*	gal.	4.50	8.00
Calcium Hypochlorite (dms.) (cwt.)	ton	33.30	37.90
Shellac, Orange Gum	lb.	.35	.45
VanWax*	gal.	2.00	2.05

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	—	.65
Chlorowax 40*	lb.	.15	.17½
50*	lb.	.16	.18½
70*	lb.	.18½	.20
Halowax*	lb.	.36	.46
Zinc Borate 3167*	lb.	.1920	.2020
Zyrox Compounds*	lb.	.38	.95½

LATEX MODIFIERS

Crux*	lb.	.30	.65
Foamnix*	lb.	.60	1.50
Ludox	lb.	.15	.16¾
Nopco EB*	lb.	.16¾	.18¾
EB-1*	lb.	.16¾	.18¾
EB-5*	lb.	.19½	.21½
OPD-101*	lb.	.29	.40
Piccopale A-1 Emulsion	lb.	.086	.113
A-20	lb.	.089	.116
A-22	lb.	.097	.124
A-41; A-43	lb.	.0775	.0145
C-1	lb.	.091	.118
N-3	lb.	.100	.127
STAYB*	lb.	.25	.45
Syton 200	lb.	.15	.16¼
Ubatol U-2001* (t.c.)	lb.	.166	.187
U-2003* (t.c.)	lb.	.184	.208
U-2007* (t.c.)	lb.	.166	.187
U-3025* (c.l.)	lb.	.223	.235
U-3040* (c.l.)	lb.	.260	.272
U-3045* (c.l.)	lb.	.260	.272
U-3050* (c.l.)	lb.	.195	.207
Webnix*	lb.	1.25	2.00

LUBRICANTS, MOLD

Akro Gel*	lb.	—	.165
Alipal CO-433*	lb.	—	.20
CO-436*	lb.	—	.24
Aluminum Stearate Crown Brand*	lb.	.37	.42
Amine, Mixed Crude*	lb.	.19	.25
Aquadag*	lb.	3.50	4.00
Aquarex D*	lb.	—	.81
L*	lb.	—	.94
ME*	lb.	—	.82
MDL*	lb.	—	.33
WAQ*	lb.	—	.22
Armeen HT*	lb.	.34	.40
180*	lb.	.52	.56
Armid HT (flaked)*	lb.	.42	.46
0*	lb.	.39	.41
Borax, Granular (l.c.l.)	ton	89.00	94.00

LUBRICANTS, MOLD (Cont'd)

Carbowax 4000*	lb.	.31	.32
CD Mold Release B*	gal.	5.00	—
B-2*	gal.	5.00	—
Colite Concentrate* (dms.)	gal.	.90	1.15
Colite D43D*	gal.	1.15	1.40
Concentrex*	lb.	—	.25
Dag Dispersion No. 197*	lb.	1.95	2.90
D.C. 7 Compound*	lb.	4.70	5.80
D.C. Emulsion No. 7*	lb.	1.59	2.07
No. 8*	lb.	1.15	1.69
No. 35*; 35A*	lb.	1.15	1.69
No.35B*	lb.	1.15	1.69
No. 36*	lb.	1.15	1.69
D.C. Mold Release Fluid*	lb.	2.90	3.47
Dri-Lube*	lb.	—	.22
Dry-Flo* (50 lb. bags)	lb.	21.40	—
Emulsion Lubricant A80*	lb.	—	1.20
45*	lb.	—	1.20
G-E Silicone Emulsion SM-55*	lb.	1.15	1.69
SM-61*	lb.	1.15	1.69
SM-62*	lb.	1.15	1.69
G-E Silicone Fluid SF-92*	lb.	2.90	4.05
SF-96*	lb.	2.90	4.05
Hawkeye Flake* (dlvd.)	lb.	.11½	.13¼
Igepal CO-430*	lb.	—	.29
CO-630*	lb.	—	.29
CO-530*	lb.	—	.29
Igepon AP-78*	lb.	—	.48
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
Kokobace R*	lb.	.17½	.18½
Lipal 9-N*	lb.	.28	.29
7-O*	lb.	.29	.30
Lubrex	lb.	.25	.30
Lubri-Flo*	gal.	10.00	12.00
Migralube*	lb.	—	.35
ML-1027-2C*	gal.	—	2.65
ML-1029-2C*	gal.	—	2.65
Mold Lubricant No. 72 Conc.* (dms.)	gal.	—	1.90
Mold Lubricant No. 426* (dms.)	lb.	.18	.17
No. 735* (dms)	gal.	—	1.25
No. 769* (dms.)	gal.	—	1.20
No. 825* (dms.)	gal.	—	2.00
No. 856* (dms.)	gal.	—	1.90
No. 880* (dms.)	gal.	—	1.19
No. 887* (dms.)	gal.	—	1.80
No. 935* (dms.)	gal.	—	1.56
No. 956* (dms.)	gal.	—	2.50
No. 965* (dms.)	gal.	—	2.15
No. 967* (dms.)	gal.	—	2.40
No. 969* (dms.)	gal.	—	1.50
No. 970* (dms.)	gal.	—	4.50
No. 975* (dms.)	gal.	—	2.85
No. 980* (dms.)	gal.	—	1.53
No. 987* (dms.)	gal.	—	2.45
A 187* (dms.)	gal.	—	1.90
A 256* (dms.)	gal.	—	1.20
A 988* (dms.)	gal.	—	2.60
Moldeze No. 3*	gal.	—	4.95
Mold-Brite*	gal.	—	1.50
Monopole Oil MD*	lb.	—	.16
MR-22 Silicone Semi-Permanent	gal.	9.95	14.95
Olate Flakes*	lb.	.23½	.24¾
Orvus WA Paste* (dms.)	lb.	—	.23¼
Plaskon Polyethylene S*	lb.	.32	.47
Poly-Brite PE-20	lb.	.28	.42
600	lb.	.42	.58
Poly-Cone 125X	lb.	1.15	1.30
1,000	lb.	.91	1.04
Polyglycol 15-200*	lb.	.25	.28¾
E4000*	lb.	.31	.37
Prodag*	lb.	.32	.60
Purity Flake* (dlvd.)	lb.	.14¾	.16½
Rubber-Flo*	gal.	1.25	2.00
Rubber-Glo*	gal.	—	.94
Rusco Mold Paste*	lb.	.25½	.32
Sericite* (l.c.l.)	ton	65.00	75.00
Silicone Oil A145*	lb.	3.22	3.61
A220* (dms.)	lb.	—	2.80
Silrex (dms.)	lb.	—	.65
Rubars*	lb.	—	.22¾
Soybean Lecithin	lb.	.13	.17
Thermalube*	lb.	—	.13¾
UC Silicone L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-45*	lb.	1.15	1.69
LE-450*	lb.	1.15	1.69
Ucon Lubricants*	lb.	.26¾	.27¾
Ulco Mold Soap*	lb.	.19	.29

LUBRICANTS, RUBBER

Cyclolube NN-1; NN-2; NN-3	gal.	.12½	.20½
NN-4	gal.	.13½	.21½
114	gal.	.19	.27
4053	gal.	.21	.29
Diglycol Stearate Neutral (and SE) (dms.)	lb.	—	.25
Extrud-o-Lube*	gal.	1.33	1.54
Ivory Chips*	lb.	.19¾	.20¾
LatexLube GR* (dlvd.)	lb.	.19¼	.21½
No. 82-A* (450 lb. dms.)	lb.	—	.08½
Nopcowax 22-DS*	lb.	.38½	.41
Propylene Stearate (dms.)	lb.	.35	.60
Versa-Lube B*	lb.	.16	.18

Pull the tab
and watch
the oldest name in
carbon black
become the newest
name in carbon black

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has changed
its name
to . . .

125 HIGH STREET, BOSTON 10, MASSACHUSETTS

For the benefit of your records,
we'd like to announce that as of
October 1, 1960, Godfrey L. Cabot, Inc.
is to be known as Cabot Corporation.
The name has changed —
but nothing else has.
Our address, telephone number and
cable address remain exactly the same.
And all the products and skills
which have made Cabot the world's
number one producer of Carbon Black
(and an increasingly important
supplier of other vital raw
materials for industry, as well)
are at your disposal as always.

Our desire and ability to find new
and better ways to be of service
to you are stronger than ever.

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CABOT CORPORATION

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LUBRICANTS, RUBBER SURFACE

Antidust	lb.	.37	.41
Barium Stearate	lb.	.41	.46
Calcium Stearate	lb.	.39	.44
Crown Brand*	lb.	.37	.42
D.C. 7 Compound*	lb.	4.70	5.80
D.C. 200 Fluid*	lb.	2.90	3.47
ELA*	lb.	—	.82
G-E Silicone Fluid SF-92*	lb.	3.04	4.25
Glycerized Lubricant*	gal.	1.25	1.48
Glydag B*	lb.	1.60	2.25
Glyso-Lube* (dms.)	lb.	—	.14
No. 3* (dms.)	lb.	—	.14
Hydro-Zinc*	lb.	—	.20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	.19¼
R-66*	lb.	—	.17¼
Liqui-Lube* (dlvd.)	lb.	—	.17¾
N.F.* (dlvd.)	lb.	—	.17¾
N.T.* (dlvd.)	lb.	—	.16¾
Lubrex*	lb.	.27	.32
Lubri-Cote	gal.	.86	1.00
Magnesium Stearate	lb.	.42	.47
Crown Brand*	lb.	.40	.45
Polyethylene Glycol	lb.	.22	.26
Rexanol*	lb.	—	.13
Rubber Free (Concentrate)*	gal.	—	1.44
Jel*	lb.	.18	.21½
Separex*	lb.	.08½	.10½
Slab-Dip* (dms.)	lb.	—	.17
Soybean Lecithin	lb.	.13	.17
Stock-Lube*	lb.	—	.19
UC L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-450*	lb.	1.15	1.69
XL-42*	lb.	3.10	4.75
XLE-42*	lb.	1.22	1.70
XLE-420*	lb.	1.18	1.70
Wet Zinc*	lb.	—	.22¼
CW*, P*	lb.	—	.20
Zinc Stearate	lb.	.41	.46

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	1.65
Alkon* (dlvd.)	lb.	.16	.16½
CA-301*	gal.	—	2.49
CA-302*	gal.	—	2.63
G-O 6910*	lb.	.38	.40
Metso Anhydrous*	cwt.	5.70	7.95
Metso 99*	cwt.	5.00	7.25
200*	cwt.	6.70	8.95
Granular*	cwt.	4.45	6.70
Orvus Extra Granules*	lb.	.23¼	.24¼
Polo*	lb.	.12¾	—
Rubber-Sol*	gal.	2.97	3.97
Shelblast*	lb.	.04	.08¾
Sprex A.C.* (dlvd.)	lb.	.17¾	.18¾
Zip Mold Cleaner*	gal.	1.05	1.55

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	1.25
Pepton 22 Plasticizer*	lb.	.83	.86
65*	lb.	1.23	1.26
65B*	lb.	.83	.86
Pitt-Consol 640 (dms.)	lb.	—	.42
RPA 2*	lb.	—	.85
3*	lb.	—	.51
3 Conc.*	lb.	—	.85
6*	lb.	—	1.66

PLASTICIZERS & SOFTENERS

Actisil	lb.	.26	.27
Acto 500*	lb.	—	.0[illegible]
Adipol BCA*	lb.	.47	.47½
2EH*	lb.	.42½	.44
10A*	lb.	.42½	.44
ODY*	lb.	.42½	.44
810*	lb.	.42½	.45½
XX*	lb.	.42½	.44
Admex 562 (dms.)	lb.	.50¾	.51¾
710 (dms.)	lb.	.35¾	.36¾
711 (dms.)	lb.	.37¾	.38¾
744 & 745 (dms.)	lb.	.41¾	.42¼
760 (dms.)	lb.	.59¾	.60¼
761 (dms.)	lb.	.46¾	.47¼
770 (dms.)	lb.	.42¼	.43
Anhydrol 6990*	lb.	.51	.56
Arneel SD*	lb.	.34	.40
Arolene 1980* (c.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.08	.08½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¼	.03¼
B*	lb.	.06¼	.06½
Bavol D*	gal.	—	.382
F*	gal.	—	.52
Bearflex 1751*	lb.	.14	.15
LPO*	lb.	.03	.04
MPO*	lb.	.03¼	.04¾
Beeswax, Bleached	lb.	.73	.75
Yellow Refined	lb.	.64	.65
Bondogen*	lb.	.55½	.60½
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¾	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285
B.A.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310

PLASTICIZERS & SOFTENERS (Cont'd)

B.R.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.1635	.1735
Butyl Carbitol Perlargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Perlargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.26	.27
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.26	.27
Byerflux*	gal.	.24	.27
Califlux 510* (and 550*)	lb.	.02¾	.03¼
G.P.*	lb.	.01½	.02½
R-100*	lb.	.04¾	.05¼
LBL*	gal.	.17	.25
OSR*	lb.	.01⅞	—
RC*	gal.	.13½	.21½
TT*	lb.	.0195	.0295
Candelilla Wax, Prime	lb.	.53	.64
Refined Light	lb.	.56	.60
Carbowax 4000* (dms.)	lb.	.68	.70
Cardolite NC-103*	lb.	.36	.59
Carnauba Wax, Crude	lb.	.73	.74
Flaked	lb.	.73	1.25
Refined, Technical	lb.	.73	.74
Refined, Pure	lb.	.82	.86
Yellow	lb.	1.10	1.15
Celluflex* (dms.)			
112* (t.c., dlvd.)	lb.	—	.32½
179-A* (t.c., dlvd.)	lb.	—	.32½
179-C* (t.c., dlvd.)	lb.	—	.32½
179-EG* (t.c., dlvd.)	lb.	—	.32½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.28½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.12	.30
Chlorowax 40*	lb.	.15	.17½
50*	lb.	.16	.18½
70*	lb.	.18½	.20
LV*	lb.	.17	.19½
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Cyclolube OSR*	gal.	.28	.36
Darex DBM*	lb.	.30½	.34
DBP*	lb.	.30	.33½
DOP*	lb.	.30½	.33½
DIOP*	lb.	.30½	.33½
D.B.M.*	lb.	.32	.34¾
Decylbutyl Phthalate	lb.	.27	.29½
Degras, Common	lb.	—	.14
Diallyl Phthalate	lb.	.51½	.52½
Dibenzyl Sebacate (dms.)	lb.	.93	.93½
Dibutoxyethyl Sebacate	lb.	—	.61½
Dibutyl Phthalate (dms.)	lb.	.31	.32½
Dibutyl Sebacate	lb.	.67½	.68
Dicapryl Adipate (dms.)	lb.	.41½	.42½
Dicapryl Phthalate (dms.)	lb.	.27½	.29
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.50	.50½
Dicyclohexyl Phthalate	lb.	.45	.46½
Diethyl Phthalate (dms.)	lb.	.29	.30½
Di-2-ethylhexyl Phthalate (dms.)	lb.	.28½	.30
Dihexyl Adipate (dms.)	lb.	.46½	.47½
Dihexyl Phthalate (dms.)	lb.	.32½	.33½
Dihexyl Sebacate (dms.)	lb.	.66	.66½
Diisobutyl Azelate	lb.	—	.47¾
Diisobutyl Phthalate	lb.	.29½	.31
Di-iso-octyl Adipate	lb.	.42½	.43½
Dimethyl Phthalate (dms.)	lb.	.29	.30½
Dimethyl Sebacate (dms.)	lb.	1.30	1.30½
Dinonyl Adipate	lb.	.44½	.47½
Dinopol IDO*	lb.	.28	.29½
MOP*	lb.	.29	.30½
Dioctyl Adipate (dms.)	lb.	.42½	.43½
Dioctyl Phthalate (dms.)	lb.	.27½	.29
Dioctyl Sebacate (dms.)	lb.	.61¼	.62¼
D.I.O.P. (dms.)	lb.	.27½	.29
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex* 1, 6, 7	gal.	.18	.23
6H	gal.	.13	—
15E	gal.	.11	.23
20, 25	lb.	.03	.06
33	gal.	.21	.33
DX-111	lb.	.13¼	.14¼
DX-111 NS	lb.	.14¼	.15¼
DX-40	lb.	.14¾	.15¾
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.38
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.39¼	.40¼
Drapex 4.4*	lb.	.34¾	.35¾
Drapex 7.7*	lb.	.37	.38
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.29	.30
DOP*	lb.	.29	.30½
TOF*	lb.	.47	.48
3GH*	lb.	—	.46¾
3GO*	lb.	—	.55¾
4GO*	lb.	—	.36½
426*	lb.	.28½	.30
Flexricin P-1*	lb.	.33½	.36½
P-4*	lb.	.30½	.33¼
P-6*	lb.	.37	.40
P-8*	lb.	.30¼	.33¼

PLASTICIZERS & SOFTENERS (Cont'd)

Fortex A* (dms.)	lb.	.12½	.14½
Fura-Tone NC-1008*	lb.	.28	.39
Galex W-100*	lb.	.15½	.19¼
Good-rite GP233*	lb.	.40	.43½
GP235*; GP236*	lb.	.40	.43½
GP261*	lb.	.28	.31½
GP265*	lb.	.28½	.32
GP266*	lb.	.29	.32½
GP-266-BPA*	lb.	.29	.32½
Hallco C-255-NS*	gal.	.27½	.29½
C-566*	lb.	.11	.13
Harflex 300* (dms.)	lb.	.60½	.61
325* (dms.)	lb.	.45	.45½
375* (dms.)	lb.	.76	.76½
500* (dms.)	lb.	.34	.35
HB20*	lb.	.17	.18½
HB40*	lb.	.21½	.23
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.25	.32
No. 39*	lb.	.22	.29
Indonex W-2*	gal.	.12	—
Isooctyl Decyl Phthalate (dms.)	lb.	.28	.29½
Kapsol*	lb.	.35	.35½
Kenflex A & N*	lb.	.19	.34
Kesscoflex BCL* (dms.)	lb.	—	.37
BCO* (dms.)	lb.	—	.33
BCP* (dms.)	lb.	—	.36
BCS* (dms.)	lb.	—	.32
BO* (dms.)	lb.	—	.28¼
BS* (dms.)	lb.	—	.27½
DBT* (dms.)	lb.	—	.68
DIOA* (dms.)	lb.	—	.43½
DOA* (dms.)	lb.	—	.43½
MCO* (dms.)	lb.	—	.35½
MCP* (dms.)	lb.	—	.41
MCS* (dms.)	lb.	—	.35
TRA* (dms.)	lb	—	.40
KP 23*	lb.	.32½	.33½
90*	lb.	.42½	.43½
140*	lb.	.48	.48½
201*	lb.	.45	.46½
260*	lb.	.36½	.37½
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.37½	.38½
Kronitex AA* (dms.)	lb.	.35	.36
I, K-3, MX*	lb.	.35	.36
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.29¾
Lindol* (dms., t.c.)	lb.	—	.32½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.40½	.41
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex DOS*	lb.	.59½	.60½
DBS*	lb.	.65½	.66½
S-70*	lb.	.41	.42
S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.21	.26
Flaked	lb.	.29	.29
Morflex*	lb.	.32	.69½
Natac*	lb.	.1585	.1685
Nebony Resins* (dms.)	lb.	.04½	.05½
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12	.17½
LX-782 (dms.)	lb.	.07½	.08½
LX-828* (dms.)	lb.	.11	.12½
LX-1000* (dms.)	lb.	.12	.13
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.29	.30½
R9* (dms.)	lb.	.37¼	.37¾
OPD*	lb.	.29	.40
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Panaflex BN-1*	lb.	.18	.22¼
Panarez 3-210	lb.	.12½	.14
6-210	lb.	.12	.13½
12-210	lb.	.11½	.13
Paradene Resins (dms.)	lb.	.07¼	.08
No. 2 Flaked	lb.	.08	.08½
Para Flux* (dms.)	gal.	.22	.25
2016* (dms.)	gal.	.22	.26
Para Lube* (t.c.l.)	lb.	.046	.048
Paraplex G-25*	lb.	.76	.77
G-40*	lb.	.50	.51
G-50*	lb.	.40¾	.41¾
G-53*	lb.	.45	.46
G-60* (and G-61*)	lb.	.32¼	.32¼
G-62*	lb.	.33¼	.33¾
Parmo*	lb.	.06	.13½
Peroxidol 780*	lb.	.33¼	.36¼
781*	lb.	.34¾	.37¾
Petroflux MV*	gal.	.097	.177
Petrolatum (dms.)	lb.	.04¼	.14¾

PLASTICIZERS & SOFTENERS (Cont'd)

PG-16*	lb.	——	.35
Philrich-5* (t.c.)	gal.	——	.12½
Picco 10* (and 25*)	lb.	.15	.15½
60* (and 75*)	lb.	.14½	.15
100*	lb.	.14½	.17
Piccocizer 30*	lb.	.06½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.24	.25
FT* (FHX* & FX*)	lb.	.1695	.1745
T-135*	lb.	.19	.20
Piccolyte S Resins*	lb.	.20½	.23½
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.18
Pigmentar* Pigmentaroil*	lb.	.510	.684
Pitt-Consol 500* (dms.)	lb.	.30	.30½
Plastac M*	lb.	——	.09¼
Plasticil	lb.	.10½	.11¾
NS	lb.	.11½	.12¾
Plasticizer 2286*	lb.	——	.20¼
Plasticizer 4141*	lb.	.42½	.43½
Plasticizer DP-200, DP-250, DP-520*	lb.	.45	.45¾
DP-316*	lb.	.32¾	.33½
DP-317*	lb.	.46	.47¼
DP-8732*	lb.	.44¾	.46
Plasticizer LP*	lb.	——	.07
Plasticizer MP*	lb.	——	.08
Plasticizer MT-511*	lb.	——	.69¼
Plasticizer OLN*	lb.	.36	.42
Plasticizer SC*	lb.	.42	.46
Plasticizer W-13*	lb.	.37	.38¾
Plastoflex 3*	lb.	——	.52
52*	lb.	.37¾	.38¾
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.08¾	.09
Plastolein 9050* (c.l.)	lb.	.54½	.56½
9055*	lb.	.30½	.32½
9058*	lb.	.48	.50
9250*	lb.	.38¼	.40¼
9715*	lb.	.39	.40
Plastone	lb.	.23	.27
Polycizer 162*	lb.	.27½	.29
332*	lb.	.42½	.44
562*	lb.	.28	.29½
662*	lb.	.28½	.30
532 and 632*	lb.	.42½	.44
ED*	lb.	——	.45
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.13¾	.14¾
D*	lb.	.22½	.23½
6*	lb.	.05¾	.07¾
Poly-Sperse AP-2	lb.	.23	.29½
AP-300, LC-20	lb.	.26	.32½
Poly-Sperse R-100	lb.	.17	.23½
Process Oil C-255* (c.l.)	gal.	.27½	.29½
Propylene Stearate (dms.)	lb.	——	.32
PRR 1*	gal.	.15	.35
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380	.0554
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0380	.0554
PX-5	lb.	.21½	.22½
PX-7	lb.	.24	.25
PX-104* (dms.)	lb.	.31	.32½
PX-108* (dms.)	lb.	.28½	.30
PX-138* (dms.)	lb.	.27½	.29
PX-208* & 238* (dms.)	lb.	.42½	.43½
PX-404* (dms.)	lb.	.67½	.68½
PX-438* (dms.)	lb.	.61¼	.62¼
PX-800* (dms.)	lb.	.35¼	.36¼
PX-917* (dms.)	lb.	.35	.36
RC Plasticizer B-17* (dms.)	lb.	.23½	.24½
O-16* (dms.)	lb.	.30	.31
TG-8*&TG-9* (dms.)	lb.	.34½	.35½
TG-85* (dms.)	lb.	.36½	.37½
RC Polymeric BGA* (dms.)	lb.	.45½	.46½
Reogen*	lb.	.14¼	.14½
Resin C*	lb.	.0225	.0310
731D	lb.	.17½	.18½
Resinex*	lb.	.03¾	.05½
L-4*	lb.	.02¼	.04¼
Rexflex*	lb.	——	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	——	.37
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	.18	.25¾
Santicizer B-16*	lb.	.46¾	.47¾
E-15*	lb.	.53	.54
M-17*	lb.	.44	.45
No. 140*	lb.	.35	.36
No. 141*	lb.	.36½	.37½
No. 160*	lb.	.27½	.29
No. 602*	lb.	——	.28½
No. 603*	lb.	.27	——
Sherolatum*	lb.	.03½	.04
Staflex DBES*	lb.	.58½	.61½
DOS*	lb.	.59¼	.62¼
IXA*	lb.	.3	.3
KA*	lb.	.34	.36¾
Stan Chlor Oils*	lb.	.13½	.20
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Staybelite Resin	lb.	.13¾	.15
Sunny South Burgundy Pitch*	lb.	.123	.1285
Rosin Oil*	gal.	.605	.76
Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	——	.33
Synthetic Revertant Oil	lb.	——	.16
Tar, Refined	gal.	.1200	.1260
Tarpine	lb.	.035	.050

PLASTICIZERS & SOFTENERS (Cont'd)

Terpene A*	gal.	——	.65
Tetraflex R-122*	lb.	.27	.30½
TP-90B*	lb.	.59	.69
TP-95*	lb.	.65	.75
Transphalt Resins*	lb.	.03¾	.05¾
Tributyl Phosphate	lb.	.52½	.53½
Tricresyl Phosphate	lb.	.35	.36
Triphenyl Phosphate	lb.	.41½	.43½
Turgum S*	lb.	.1460	.1560
Turgum SB*	lb.	.09½	.10½
Turpol NC-1200*	lb.	.67	.70
NC-1300*	lb.	——	.50
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	——	.31
Witcizer 100*	lb.	.26	.27
200*	lb.	.22¾	.25¾
300*	lb.	.30	.33½
312*, 313*	lb.	.28	.31½
412*	lb.	.42½	.46

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	.25½	.26½
Refined (dms.)	lb.	——	.18
Castorwax*	lb.	.25	.31
Dutrex 7*	lb.	.12	.20
ELA*	lb.	——	.82
Foamnix*	lb.	.60	1.50
Hydrotol Glycerides 200*	lb.	.15½	.19¾
Kenflex N*	lb.	.19	.26
Maleic Anhydride	lb.	——	.27
Millrex*	lb.	——	.15
Nadic Anhydride	lb.	——	.75
Polycin*	lb.	——	.24½
R-B-H Resin 510*	lb.	.19	.26
530*	lb.	.25	.32
STAYB*	lb.	.25	.45
Thiomalic Acid	lb.	——	3.50
Webnix*	lb.	1.25	2.00
Zyrox*	lb.	.78	.88

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾	.21
Alcogum*	lb.	.08½	.24
Alpha Protein	lb.	——	.23
Aroostoocrat*	lb.	——	.07½
Carob Bean Flour	lb.	——	.50
Casein	lb.	.22	.35
Emcol K-8300* (dms.)	lb.	.14	.18
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	——	.23
Karaya Gum	lb.	——	.35
Locust Bean Gum	lb.	——	.50
Modicol VD*	lb.	.13⅜	.15⅞
Prosem*	lb.	——	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.34	.35
Armeen C*	lb.	.46	.52
Mixed Crude*	lb.	.19	.25
T*	lb.	.32	.38
Blend No. 27 Oil	gal.	.35	.42
Burco RA*	lb.	.05	.081
BWH-1*	gal.	.16	.17
C-6 Oil* (28* & 34*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	——	.21½
C-42* (t.c.)	gal.	——	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	——	5.20
Liquid 50% (t.c.)	cwt.	——	2.90
Solid 76% (c.l., dms.)	cwt.	——	4.80
Cresylic Acid (99-100%)	gal.	.85	1.39
D-4* (t.c.)	gal.	——	.27
E-5* (t.c.)	gal.	——	.25
Flake Calcium Chloride (77-80%)	ton	——	31.00
(94-97%)	ton	——	39.80
Gensol No. 6* (t.c.)	gal.	——	.42
Heavy Aromatic Naphtha	gal.	.13¼	.18½
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¾
42-70*	lb.	.08¼	.10¾
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
Nucom* (t.c.)	gal.	——	.42
Pitt-Consol 500 (dms.)	lb.	.30	.30½
640 (dms.)	lb.	.42	.42
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380	.0554
Q Oil* (t.c.)	gal.	——	.286
Reclaiming Oil 3186-G*	gal.	.26	.33
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	——	.51
RR 10*	lb.	——	.37
Soda Ash (c.l., bags)	cwt.	——	1.85
Solvenol No. 1	gal.	.50	.67
No. 2	gal.	.41	.62
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
701 Oil*	gal.	.27	.29

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Dixiedensed (and S)*	lb.	.0775	.1550
Kosmobile (and S)*	lb.	.0775	.1550

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0850	.1625
Continental A*	lb.	.0850	.1625
Dixiedensed HR (and S-66)	lb.	.0850	.1625
Kosmobile HM (and S-66)	lb.	.0850	.1625
Micronex Standard*	lb.	.0850	.1625
Spheron 6*	lb.	.0850	.1625
Texas M*	lb.	.0850	.1625
Witco No. 1*	lb.	.0850	.1625

Channel, Easy Processing (EPC) (bags)

Collocarb*	lb.	.0710	.1485
Continental AA*	lb.	.0850	.1625
Dixiedensed 77*	lb.	.0850	.1625
Kosmobile 77*	lb.	.0850	.1625
Micronex W-6*	lb.	.0850	.1625
Spheron 9*	lb.	.0850	.1625
Texas E*	lb.	.0850	.1625
Witco No. 12*	lb.	.0850	.1625
Wyex EPC*	lb.	.0850	.1625

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2600	.3500
Dixie 5 Dustless*	lb.	.1350	.2200
Dixie Voltex*	lb.	.2600	.3500
Kosmink Dustless*	lb.	.1350	.2200
Kosmos Voltex	lb.	.2600	.3500
Texas MC-74-BD*	lb.	.2600	.3500
Voltex*	lb.	.2600	.3500

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0875	.1550
Continex CF*	lb.	.1100	.1700
Dixie CF*	lb.	.0925	.1600
Kosmos CF*	lb.	.0925	.1600
Shawinigan Acetylene Black*	lb.	——	.1900
Vulcan C*	lb.	.1100	.1850

Extra-Conductive Furnace Black (ECF) (bags)

Vulcan XC-72 (pellets)*	lb.	.2500	.3400

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0675	.1350
Continex FEF*	lb.	.0675	.1350
Dixie 50*	lb.	.0675	.1350
Kosmos 50*	lb.	.0675	.1350
Philblack A*	lb.	.0675	.1350
Statex M*	lb.	.0675	.1350
Sterling SO*	lb.	.0675	.1350

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0725	.1400
Sterling 99*	lb.	.0725	.1400

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0600	.1275
Continex GPF*	lb.	.0600	.1275
Dixie 35*	lb.	.0600	.1275
Kosmos 35*	lb.	.0600	.1275
Statex G*	lb.	.0600	.1275
Sterling V*	lb.	.0600	.1275
V (Non-Staining)	lb.	.0600	.1275

Furnace, High Abrasion (HAF) (bags)

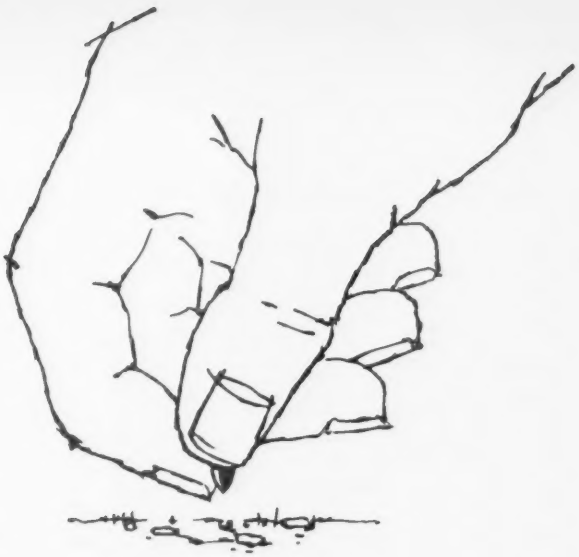
Aromex HAF*	lb.	.0775	.1450
Continex HAF*	lb.	.0775	.1450
Dixie 60*	lb.	.0775	.1450
Kosmos 60*	lb.	.0775	.1450
Philblack O*	lb.	.0775	.1450
Statex R*	lb.	.0775	.1450
Vulcan 3*	lb.	.0775	.1450

Furnace, High Modulus (HMF) (bags)

Continex HMF*	lb.	.0625	.1300
Dixie 40*	lb.	.0625	.1300
Kosmos 40*	lb.	.0625	.1300
Modulex HMF*	lb.	.0625	.1300
Statex 93*	lb.	.0625	.1300
Sterling L* and LL*	lb.	.0625	.1300

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF*	lb.	.0575	.1250
Dixie 20*	lb.	.0575	.1250
Essex SRF*	lb.	.0575	.1250
Furnex*	lb.	.0575	.1250
Gastex*	lb.	.0625	.1350
Kosmos 20*	lb.	.0575	.1250
Pelletex* and NS*	lb.	.0575	.1250
Regal*	lb.	.0575	.1250
Shawinigan Acetylene Black*	lb.	——	.1900
Sterling NS* and S*	lb.	.0578	.1250
R*	lb.	.0625	.1350



planting for tomorrow

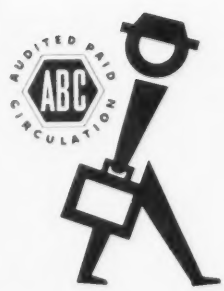
You've heard of the "hard sell" and the "soft sell" — but many of our advertisers are also interested in the "long sell".

This is *planned* advertising. You might call it "planting for tomorrow".

The sales seed in an advertising message bears abundant fruit if sown in fertile ground . . . readers of this publication, for example, who, in *buying* this issue, have demonstrated their interest in what we have to say.

As a member of the Audit Bureau of Circulations*, our circulation records have been audited and the facts published — by this impartial organization of advertisers, advertising agencies, and publishers. These bedrock facts about our circulation audience can help you to plan more productive advertising.

Is your own planned selling based on circulation facts? You can be ABC-sure. Ask to see a copy of our latest circulation report.



RUBBER AGE

* Through the reports issued by the Audit Bureau of Circulations, this publication, along with other publisher members of ABC, voluntarily and regularly give the buyers of advertising more verified factual information than is available for any other advertising media at any time.

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace Super Abrasion (SAF) (bags)

Aromax SAF	lb.	.1150	-	.1825
Dixie 85	lb.	.1150	-	.1750
Kosmos 85	lb.	.1150	-	.1750
Philblack E*	lb.	.1150	-	.1900
Statex 160*	lb.	.1150	-	.1900
Vulcan 9*	lb.	.1150	-	.1900

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0925	-	.1600
Continex ISAF*	lb.	.0925	-	.1600
Dixie 70*	lb.	.0925	-	.1600
Kosmos 70*	lb.	.0925	-	.1600
Philblack I*	lb.	.0925	-	.1600
Statex 125*	lb.	.0925	-	.1600
Vulcan 6*	lb.	.0925	-	.1600

Furnace, Super Conductive (SCF) (bags)

Conductex SC*	lb.	.1150	-	.1800
Vulcan SC*	lb.	.1800	-	.2550

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	—	-	.0625
Sterling FT (c.l.)	lb.	—	-	.0625

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	—	-	.0250
Sterling MT (c.l.)	lb.	—	-	.0450
MT Non-Staining (c.l.)*	lb.	—	-	.0550
Thermax (c.l.)*	lb.	—	-	.0450
Stainless (c.l.)	lb.	—	-	.0550

Specialty Blacks (Awaiting Classification)

Regal 300*	lb.	.0775	-	.1450
Regal 600*	lb.	.0925	-	.1600

REINFORCING AGENTS—SILICA

Cab-o-sil*	lb.	.66	-	1.25
D. C. Silica (pelletized)*	lb.	1.45	-	1.65
Hi-Sil 233*	lb.	.08¼	-	.09¾
X303*	lb.	.50	-	.60
Santocel*	lb.	.62	-	.64
Ultrasil VN-3*	lb.	.35	-	.65
Valron Estersil*	lb.	2.00	-	2.25

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	.40	-	.50
Cato 2* (100 lb. bag)	lb.	17.00	-	—
Darex Copolymer No. 3*	lb.	.47	-	.49
43G*	lb.	.39	-	.41
Darex Copolymer Latex No. 3-L	lb.	.41½	-	.46
Durez 12687 (and 12707)*	lb.	.36½	-	.40
Durez 13355*	lb.	.27½	-	.31½
Dymerex Resin	lb.	.15¾	-	.17
Good-rite Resin 2007*	lb.	.36	-	.38
2057*	lb.	.30	-	.31
Hystron*	lb.	.39	-	.41
Kralac A-EP*	lb.	.39	-	.41
Lampblack	lb.	—	-	.12
Marbon 8000*	lb.	.36	-	.43
Marmix*	lb.	.35	-	.43
Mistron Vapor*	lb.	—	-	.03½
HGO-55*	lb.	—	-	.05
Pliolite Latex 150*	lb.	.35	-	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33	-	.57
Pliolite NR*	lb.	.93	-	.95
S6B*	lb.	.36	-	.43
Plio-Tuf G85C*	lb.	.52	-	.54
Polyco 220*	lb.	.18¼	-	.19¼
Poly-Phen 201-C; 218-C	lb.	.27½	-	.29
202-C	lb.	.36	-	.37½
Polypol S-70*	lb.	.25	-	.26

RETARDERS

Akron Benzoic Acid TBAO-2*	lb.	.41	-	.43
Dutch Boy Normasal*	lb.	—	-	.46
ESEN*	lb.	.39	-	.41
Good-rite Vultrol*	lb.	.67	-	.70
Harcopol 1183*	lb.	.70	-	.74
Retarder J*	lb.	.68	-	.70
PD*	lb.	.39	-	.41
W*	lb.	—	-	.46
Retardex*	lb.	.46	-	.46
TCM-25*	lb.	.60	-	.70
Wiltrol P	lb.	.37	-	.39

RUBBER SUBSTITUTES

Mineral Rubber

Byerlyte*	ton	55.00	-	62.00
Hard Hydrocarbon (dms.)*	ton	53.00	-	60.00
Herron Flake*	ton	—	-	45.00
Mineral Rubber, Solid	ton	42.50	-	44.50
M. R. No. 38*	ton	57.00	-	70.00

RUBBER SUBSTITUTES (Cont'd)

Vulcanized Vegetable Oils

Amberex*	lb.	.29	-	.36
Brown	lb.	.15	-	.24
Car-Bel-Lite*	lb.	.33½	-	.36
Neophax*	lb.	.17	-	.27
Car-Bel-Rex A and C*	lb.	—	-	.126
White	lb.	.15	-	.26
670 Brown	lb.	.14¼	-	.14¾

Miscellaneous Rubber Substitutes

Gilsowax B*	lb.	.09	-	.11
Resin No. 1098 (dms.)	lb.	—	-	.62
No. 1198*	lb.	.46¾	-	.49¾
Tysonite*	lb.	.26	-	.26¾

SOLVENTS

Acetone (dlvd.)	lb.	.11	-	.12½
Amsco Lactol Spirits* (t.c.)	gal.	—	-	.20
Naphthol Spirits*	gal.	—	-	.19
Mineral Spirits*	gal.	—	-	.18
Rubber Solvent* (t.c.)	gal.	—	-	.19
Solv A* (t.c.)	gal.	—	-	.22
Solv A-80* (t.c.)	gal.	—	-	.23½
Solv B* (t.c)	gal.	—	-	.28
Solv B-90* (t.c.)	gal.	—	-	.31
Solv D* (t.c.)	gal.	—	-	.30
Solv E*	gal.	—	-	.30
Solv F*	gal.	—	-	.30
Solv F-80*	gal.	—	-	.32
Solv G*	gal.	—	-	.36
Special Naphtholite* (t.c.)	gal.	—	-	.19
Special Textile Spirits*	gal.	—	-	.20
Super Hi-Flash Naphtha*	gal.	—	-	.34
Super Naphtholite*	gal.	—	-	.19
Textile Spirits* (t.c.)	gal.	—	-	.20
Amyl Chlorides, Mixed (t.c.l.) (dms.)	lb.	—	-	.11
Benzol 90%	gal.	.36	-	.40
Butyl Acetate	lb.	.17	-	.18½
Butyl Alcohol	lb.	.17	-	.19½
Secondary (dlvd.)	lb.	.15	-	.16½
Tertiary (dlvd.)	lb.	.15	-	.16½
Carbon Bisulfide, Tech.	lb.	.07	-	.08½
Carbon Tetrachloride	lb.	.10¾	-	.14¾
Cosol 1*	gal.	.37	-	.43
2*	gal.	.42	-	.48
Cyclohexane	gal.	.77	-	110.00
85% (c.l.) (dms.)	gal.	—	-	.56
Cyclohexanone	lb.	.31	-	.34½
Diacetone, Pure (dlvd.)	lb.	.15½	-	.17
Dichlorethyl Ether (dms.)	lb.	.15½	-	.16½
Dichloropentanes (l.c.l.) (dms.)	lb.	—	-	.06
Dicom*	gal.	—	-	.55
Halowax Oil*	lb.	.28	-	.41
Heptanes* (t.c.)	gal.	—	-	.1609
Hexanes (t.c.)	gal.	—	-	.1584
Isobutyl Acetate	lb.	.15¼	-	.16¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.62	-	.72
Ether, Ref. (dlvd.)	lb.	.09½	-	.11
Mersol*	gal.	.43	-	.79
Mesityl Oxide (dlvd.)	lb.	.15	-	.16½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.66	-	.72
Methyl Chloride	lb.	—	-	.12¾
Methyl Ethyl Ketone	lb.	.15	-	.16½
Methyl Isobutyl Ketone (dlvd.)	lb.	.17	-	.18½
Methylene Chloride	lb.	—	-	.12½
N-5 Pentane Mix* (t.c.)	gal.	—	-	.13½
N-6 Hexanes* (t.c.)	gal.	—	-	.14½
N-7 Hexanes* (t.c.)	gal.	—	-	.13½
Nelio Dipentene	gal.	.41	-	.62
Penetrell*	gal.	.41	-	.42
Perchlorethylene	lb.	11¾	-	.15¼
Petrolene* (t.c.)	gal.	—	-	.14125
Picolines, Alpha, Refined	lb.	.43½	-	.44
Mixed	lb.	.32½	-	.33
Proprietary Solvent (dms.)	gal.	.66	-	.77
Propyl Acetate (t.c., dlvd.)	lb.	—	-	.11¾
Alcohol (t.c., dlvd.)	lb.	—	-	.11
Pyridine, Refined	lb.	.69½	-	.70
Quinoline	lb.	.50¾	-	.51¼
Rubber Solvent (t.c.)	gal.	—	-	.16
Rubsol (t.c.)	gal.	—	-	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	—	-	.16
C (Heptanes)* (t.c.)	gal.	—	-	.16¼
R (Rubber Solvent)*	gal.	—	-	.1390
Solvent, Crude, Light	gal.	.19	-	.28
Solvesso 100* (t.c.)	gal.	.33	-	.35
150 (t.c.)	gal.	.33	-	—
Sunny South DD Dipentine*	gal.	.41	-	.62
Sunny South DD Pine Oil*	lb.	—	-	.15
Sunray*	gal.	.1140	-	.1600
Toluene (dms.)	gal.	—	-	.38
Toluol (t.c.)	gal.	.25	-	.25
Trichlorethane	lb.	—	-	.12¾
Trichlorethylene	lb.	.12	-	.16¾
Triglycol Dichloride	lb.	.63	-	.64
Union Thinner 1* (t.c.)	gal.	—	-	.174
5* (dms.)	gal.	—	-	.190
7* (t.c.)	gal.	—	-	.164
2-50 W Hi-Flash*	gal.	—	-	.41
Xylol (t.c.)	gal.	.29	-	.30

STABILIZING AGENTS (for Vinyl Resins)

Advastab BC-12*	lb.	.90	-	.95
BC-74*	lb.	.70	-	.75
BC-105*	lb.	.75	-	.80
CH-101*; CH-201*	lb.	.60	-	.65
E-82*	lb.	90	-	.95
JCX*	lb.	.62	-	.67
L Paste*	lb.	.65	-	.70
SN*	lb.	.47	-	.52
T-10*	lb.	1.90	-	1.95
T-50-LT*	lb.	3.20	-	3.25
XBZ-155*	lb.	.69	-	.74
XC-143*	lb.	.90	-	.95
XE-98*	lb.	.53	-	.58
Amioca 50* 85* (bags)	lb.	11.11	-	11.26
Barca 10*	lb.	.65	-	.70
Barium Stearate	lb.	.41	-	.46
Basic Silicate White Lead	lb.	.16½	-	.17¾
Cadmium Ricinoleate	lb.	—	-	2.00
Calcium Ricinoleate	lb.	—	-	.55
Dutch Boy DS-207*	lb.	—	-	.54
B*	lb.	—	-	.32½
Tribase*	lb.	—	-	.27½
Dythal*	lb.	—	-	.39½
Ferro 182* (dms.)	lb.	.70	-	.76
200* (dms.)	lb.	1.33	-	1.43
203* (dms.)	lb.	.87	-	.91
541* (dms.)	lb.	.35½	-	.45½
541A* (dms.)	lb.	.82	-	.86
700* (dms.)	lb.	.48¾	-	.58¾
900* (dms.)	lb.	.90	-	.94
903* (dms.)	lb.	.60	-	.64
909* (dms.)	lb.	.91	-	.95
920*	lb.	—	-	.98
931* (dms.)	lb.	.75¾	-	.85¾
993* (dms.)	lb.	.89	-	.99
1203* (dms.)	lb.	1.30	-	1.40
1206* (dms.)	lb.	1.32	-	1.36
1820* (dms.)	lb.	.90	-	.94
1825* (dms.)	lb.	1.00	-	1.04
1976*	lb.	.47	-	.51
Harshaw 1-V-3*	lb.	.43	-	.45
1-V-4*	lb.	.68	-	.70
1-V-7*	lb.	.70	-	.72
2-V-4*	lb.	.85	-	.87
2-V-8*	lb.	1.31	-	1.33
5-V-1*	lb.	.41	-	.43
6-V-1B*	lb.	—	-	.55
6-V-2*	lb.	—	-	.55
6-V-6*	lb.	—	-	.55
6V-10*	lb.	—	-	.55
7-V-2*	lb.	.93	-	.95
8-V-1*	lb.	.82	-	.84
8-V-100*	lb.	.82	-	.84
9-V-1*	lb.	.70	-	.72
12-V-5*	lb.	.73	-	.75
24-V-1*	lb.	1.10	-	1.12
128-V-5*	lb.	.86	-	.88
Istabelan No. 115 Liquid	lb.	.85	-	.95
No. 120 Liquid	lb.	.65	-	.75
Kosol* (50 lb. bags)	lb.	19.00	-	—
Lithium Stearate	lb.	.52	-	.57
Fluffy	lb.	.47½	-	.70
Standard	lb.	.52½	-	.75
Mark A*	lb.	2.80	-	3.15
C*	lb.	.81	-	.84
E*	lb.	.72	-	.75
GS*	lb.	.77	-	.80
LL*	lb.	.59	-	.62
KCB*	lb.	.59	-	.62
M*	lb.	.59	-	.62
PL*	lb.	.62	-	.65
TT*	lb.	.72	-	.75
WS*	lb.	.97	-	1.00
X*	lb.	2.50	-	2.75
XI*	lb.	.87	-	.90
XV*	lb.	.84	-	.87
XX*	lb.	.57	-	.60
33*; 34*; 35*	lb.	.97	-	1.00
Metasap 613-A*	lb.	—	-	.69
613-B*	lb.	—	-	.84
613-C*	lb.	—	-	1.06
621*	lb.	—	-	.88
624*	lb.	—	-	.75
633*	lb.	—	-	.75
635*	lb.	—	-	.45
Modicol N*	lb.	.42½	-	.44½
S*	lb.	.30⅞	-	.32⅞
Nonisol 100	lb.	.38	-	.43
Sodium Silicates 41°/1:3.2	cwt.	1.20	-	2.30
Stabilizer No. 52*	lb.	1.90	-	2.00
89X*	lb.	.75	-	.80
B-5*	lb.	—	-	.70
E6B*	lb.	—	-	.95
G-1*	lb.	1.25	-	1.40
HR*	lb.	.85	-	.89
L*	lb.	—	-	.60
OM-10*	lb.	—	-	1.95
Staflex OY*	lb.	1.00	-	1.20
QXMA*	lb.	—	-	.70
Stayrite 10*	lb.	.36	-	.41
P-10*	lb.	.43	-	.45
15*	lb.	.55	-	.57
20*	lb.	.41	-	.46
22*	lb.	1.00	-	1.13
25*	lb.	.35	-	.40
70*	lb.	.70	-	.72
71*	lb.	.90	-	.92
75*	lb.	.61	-	.63
76*	lb.	.53	-	.55
80*; 90*	lb.	.70	-	.72
95*	lb.	.70	-	.72
229*	lb.	.61	-	.63

STABILIZING AGENTS (Cont'd)

Vanstay A* (dms.)	lb.	.50	.53
AB* (dms.)	lb.	.46	.49
AC* (dms.)	lb.	.45	.48
CE* (dms.)	lb.	.44	.47
HT* (dms.)	lb.	.87	.90
HTA* (dms.)	lb.	.97	1.00
HTB* (dms.)	lb.	.70	.73
HTC* (dms.)	lb.	1.09	1.12
HTE* (dms.)	lb.	.80	.83
L* (dms.)	lb.	.32	.35
R* (dms.)	lb.	.67	.70
RR* (dms.)	lb.	.59	.62
RZ-25* (dms.)	lb.	.65	.69
S* (dms.)	lb.	.57	.60
SA* (dms.)	lb.	.81	.84
W* (dms.)	lb.	1.22	1.25
Z* (dms.)	lb.	.62	.65

STIFFENING AGENTS

Polyac*	lb.	—	1.85
Processinfi Stiffener 710*	lb.	.88	.90
Solvitose HDF, H, C-S, T, and E*	lb.	.22	.25
Versatil Gum 8-E*	lb.	.15	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	—	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.31	.32
Microflake*	lb.	.20	.24
Nacconol NRSF*	lb.	.40½	.45
NBC*	lb.	—	1.67
Ross Sunproofing Waxes*	lb	—	.15
Sunolite*	lb.	.16	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.32	.33
Improved*	lb.	.25	.26
Super*	lb.	.41	.42
Jr.*	lb.	.22	.23
Tonox*	lb.	.54	.56

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56	.59
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Aquarex D*	lb.	—	.81
G*	lb.	—	.21
MDL*	lb.	—	.33
ME*	lb.	—	.82
NS*	lb.	—	.60
SMO*	lb.	—	.50
WAQ*	lb.	—	.22
Emulphor EL-620*	lb.	—	.40
EL-719*	lb.	—	.58
ON-870*	lb.	—	.55
Hyonics*	lb.	—	.28¾
Igepal CA-630	lb.	—	.29
CO-630; CO-730*	lb.	—	.29
CO-850; CO-880*	lb.	—	.29
Igepon CN-42*	lb.	—	.25
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
T-77*	lb.	—	.49
Kessco 50201*	lb.	—	.44½
50203*	lb.	—	.44¼
18201*	lb.	—	.32
18203*	lb.	—	.35½
Lipal 9-N,* 11-0*	lb.	.28	.29
8-0,* 6-0*	lb.	.29	.30
25C,* 52C*	lb.	.34	.35
15T*	lb.	.23	.24
Nacconol NR (dlvd.)	lb.	.14½	.16
NRSF (dlvd.)	lb.	.40½	.45
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	—	.12¾
Soybean Lecithin	lb.	.13	.17
Synatol AV-60*	lb.	.28	.29

TACKIFIERS

Amalgamator Z-4*	lb.	.34	.35
Arcco 620-32B*	lb.	.20½	.21½
716-30*	lb.	.18½	.19½
1041-21*	lb.	.16½	.17½
Arcco A-26*	lb.	.18	.19
Bunaweld Polymer No. 780*	lb.	—	.24
Galex* (dms.)	lb.	.17¾	.20
Indopol H-300*	gal.	1.00	1.22
Koresin*	lb.	1.13	1.15
Liquid Rubber Flux*	lb.	—	.14
Nacconol NRSF* (dlvd.)	lb.	.40½	.45
Nilox Resin* (c.l.)	cwt.	—	16.00
Nopco 2271*	lb.	.16¾	.18¾
OPD*	lb.	.29	.40
PR-162 Resin Emulsion	lb.	.82	—
Resin V	lb.	—	.23½
Synthol* (dms.)	lb.	.26	.30¼
Vistac A*	lb.	.21½	.22¾
Vistanex LM Grades*	lb.	—	.45
Zirex* (c.l.)	cwt.	—	15.25
82 Resin Solid (dms.)	lb.	.13½	.14½
84 Resin Solid (dms.)	lb.	.13½	.14½

THICKENERS (For Latex)

Alcogum AN-6*	lb.	.06	.06½
AN-10*	lb.	.09	.10
AN-25*	lb.	—	.31
PA-15*	lb.	.13½	.17½
PA-15-B*	lb.	.13½	.17½
Betanol* (dms.)	lb.	.70	.95
CM Starch* (100 lb. bags)	lb.	26.85	—
Gomme Labolene*	lb.	.45	.47
Good-rite K-702*	lb.	.28½	.37
K-704*	lb.	.21	.22
K-705*	lb.	.30	.39
K-707*	lb.	.18	.19
K-708*	lb.	.28	.37
K-710*	lb.	.15	.16
Hycryl A-1000* (t.l.)	lb.	.090	.100
A-2000* (t.l.)	lb.	.335	.360
Hydroseal 3* (50 lb. bags)	lb.	9.19	—
Melojel* (100 lb. bags)	lb.	6.71	—
Modicol VD*	lb.	.13⅜	.15⅞
VE*	lb.	.13⅞	.16⅜
Polyco 296 BT*	lb.	.15	.16
296-N*; 530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.20	2.30
Solvitose Series*	lb.	.22	.25

VULCANIZING AGENTS

Peroxide

Di-cup	lb.	1.10	....
T	lb.	1.10	1.50
R	lb.	1.60	2.00
40C	lb.	.55	.75
UC XK-1960*	lb.	5.50	—

Selenium

Vandex*	lb.	—	7.00
VA-7*	lb.	—	.50

Sulfur

Blackbirdd* (c.l.)	cwt.	—	2.90
Cloud* (c.l.)	cwt.	—	2.85
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	—	2.45
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	—	.39
Mist* (Wettable) (c.l.)	cwt.	—	4.05
Spider* (c.l.)	cwt.	—	2.85
Star* (c.l.)	cwt.	—	4.90
Sulfasan R*	lb.	—	1.55
Tire* (c.l.)	cwt.	—	2.45
Tube* (c.l.)	cwt.	—	4.90
Vultac 2*	lb.	.47	.74
3*	lb.	.51	.78

Tellurium

Telloy*	lb.	—	4.00

WETTING AGENTS

Advawet No. 10*	lb.	—	.17
No. 33*	lb.	—	.48
Aerosol 18*	lb.	.37	.42
AY*	lb.	.75	.80
MA 80%*	lb.	.40	.45
OT 75% Aqueous*	lb.	.40	.45
OT 100%*	lb.	.75	.80
OT-B*	lb.	.65	.70

WETTING AGENTS (Cont'd)

Alrosol* (dms.)	lb.	.36	.40
Alrosperse*	lb.	—	.18
Alrowet D 65*	lb.	.31	.34
Anhydrol 6990* 6991*	lb.	.51	.56
Armacs*	lb.	.28	.77
Arquads*	lb.	.42	.61
Emcol 5100* (dms.)	lb.	—	.31
Energetic W-100	lb.	.28½	.35
Etho-Chemicals*	lb.	.26	.58
Ethomeen S/15*	lb.	.48	.50
T/15*	lb.	.46	.48
Hyonic PE-90*	lb.	.25	.27
PE-100*	lb.	.25	.27
Kessco E-122* (dms.)	lb.	—	.45
18201*	lb.	—	.32
Kreelon 4D* (dms.)	lb.	.13	.16
8G* (dms.)	lb.	.26	.28
Kyro EO* (dms.)	lb.	—	.29¾
Modicol N*	lb.	.42½	.44½
S*	lb.	.30⅞	.32⅜
Nacconol A* (dlvd.)	lb.	—	.52
NRSF* (dlvd.)	lb.	.40½	.45
SL* (dlvd.)	lb.	.084	.10
60S* (dlvd.)	lb.	.19	.225
Nekal WS-25	lb.	—	.38
WS-99	lb.	—	.95
Orvus AB Granules*	lb.	.16¼	.17¾
Parnol*	lb.	—	.13½
Regal Beads	lb.	.12¾	.16¾
H. D. Beads	lb.	.12¾	.15¾
Santomerse No. 3 Paste*	lb.	.26	.30
Sorapon SF-73*	lb.	—	.18
SF-78*	lb.	—	.30
Sorbit P*	lb.	.29	.31
Soybean Lecithin	lb.	.13	.17
Stablex G*	lb.	.50	.90
Tergitol 4* (dms., dlvd.)	lb.	.36½	.37½
7* (dms., dlvd.)	lb.	.43½	.44½
O8* (dms., dlvd.)	lb.	.36½	.37½
P28* (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.15
Vultamol*	lb.	—	.17½
Wetsit Conc.*	lb.	.35	.35

MISCELLANEOUS CHEMICALS

Aquesperse 30*	lb.	—	.11
Chiplac Paint	gal.	1.15	5.00
Copper Inhibitor No. 50*	lb.	—	1.20
D-Tac*	lb.	—	.22
Elastopar	lb.	2.05	2.07
2-Ethyl Hexanol	lb.	.23¾	.24¾
Fura-Tone Resin 1226*	lb.	.41	.43
MODX*	lb.	.38	.40
Nacconates*	lb.	.75	4.50
Para Resins*	lb.	.04	.04½
Pigmented Filmite* (dlvd.)	lb.	.16¾	—
Resorcin, Tech.	lb.	.77½	.81½
Rio Resin*	lb.	.70	.72
Rongalite CX*	lb.	—	.21½
Sherosopes*	lb.	.13½	.18¾
Sublac Resin PX-5*	lb.	.23½	.24½
Synpep*	lb.	.54	.60
Tysonite*	lb.	.30	.30½
Vanfre*	gal.	2.45	3.00
No. 3* & No. 4*	gal.	1.95	2.00

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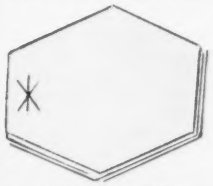

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Copy for November 1960, issue must be received by Tuesday, October 25

POSITIONS WANTED

BIG COMPANY PREFERRED: Lab, representative, relocate. Seals, rings, also belting, tires, newest polymers. Compound and design. BS '43. Address Box R-592-R, RUBBER AGE.

PRODUCTION CONTROL MANAGER: With many years experience in molded rubber and vinyl products. Desires contact with reputable growing company. Available now. Address Box R-593-P, RUBBER AGE.

EXECUTIVE RUBBER & PLASTICS CHEMIST: Now in research and development. 24 years laboratory and plant experience in cables, tires and mechanical goods. Challenging position desired. Salary over $15,000. Address Box R-594-P, RUBBER AGE.

DYNAMIC SALES EXECUTIVE recently with synthetic rubber manufacturer. Twenty years constantly productive. Experience sales and sales management. Good in development of new sales techniques, buying of new products, excellent administrator, coordinator. Seeks real challenge. Address Box R-597-P, RUBBER AGE.

PLANT OR PRODUCTION MANAGER must relocate and willing to relocate anywhere, but prefer east or south. Twenty-five years' experience in latex dipped products. Have excellent record for labor relations and production controls. Seek connections with medium size, progressive company. Address Box R-598-P, RUBBER AGE.

GENERAL MANAGER or Manufacturing Manager wishes to relocate. Twenty years heavy experience in all phases of administration and manufacturing. Successful proven record in molding and extruding, including research and development through production. Good customer liason and labor relations. Desire responsible position with progressive company. Address Box R-599-P, RUBBER AGE.

LATEX SPECIALIST: Eight years experience in chemistry and application of natural and synthetic latices in manufacture of films, foams, coatings, impregnations, and adhesives. M.S. degree. Also familiar with elastomers and thermosetting and thermoplastic resins. Interested in R & D, Production, Sales. Address Box R-601-P, RUBBER AGE.

TECHNOLOGIST—Sixteen years experience in all phases of mechanical rubber goods as development engineer, chief chemist and project manager. Interested in position with greater responsibility and challenge. Age 36, B.S. CHE., M.S. Management Engineering. Presently employed. Reply Box R-602-P, RUBBER AGE.

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With mechanical, chemical, development experience and education for expanding seasoned smaller factory to international. Opportunity and good salary if qualified. Address Box R-586-H, RUBBER AGE.

CHEMIST B.S./M.S. with minimum of three years experience in the application of latex and resins to textiles. Position involves project work on carpet backing, adhesion of rubber and textiles, development of new resins, treatment for textiles and similar assignments. Excellent opportunity. Write stating qualifications and salary requirements to Box R-600-H, RUBBER AGE.

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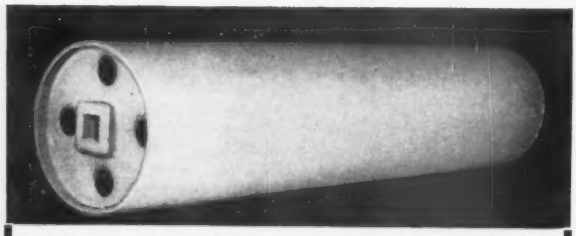

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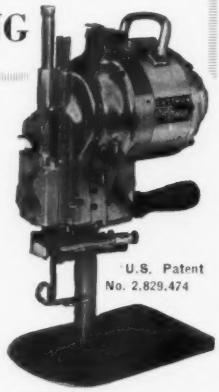

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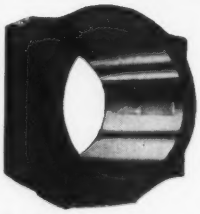

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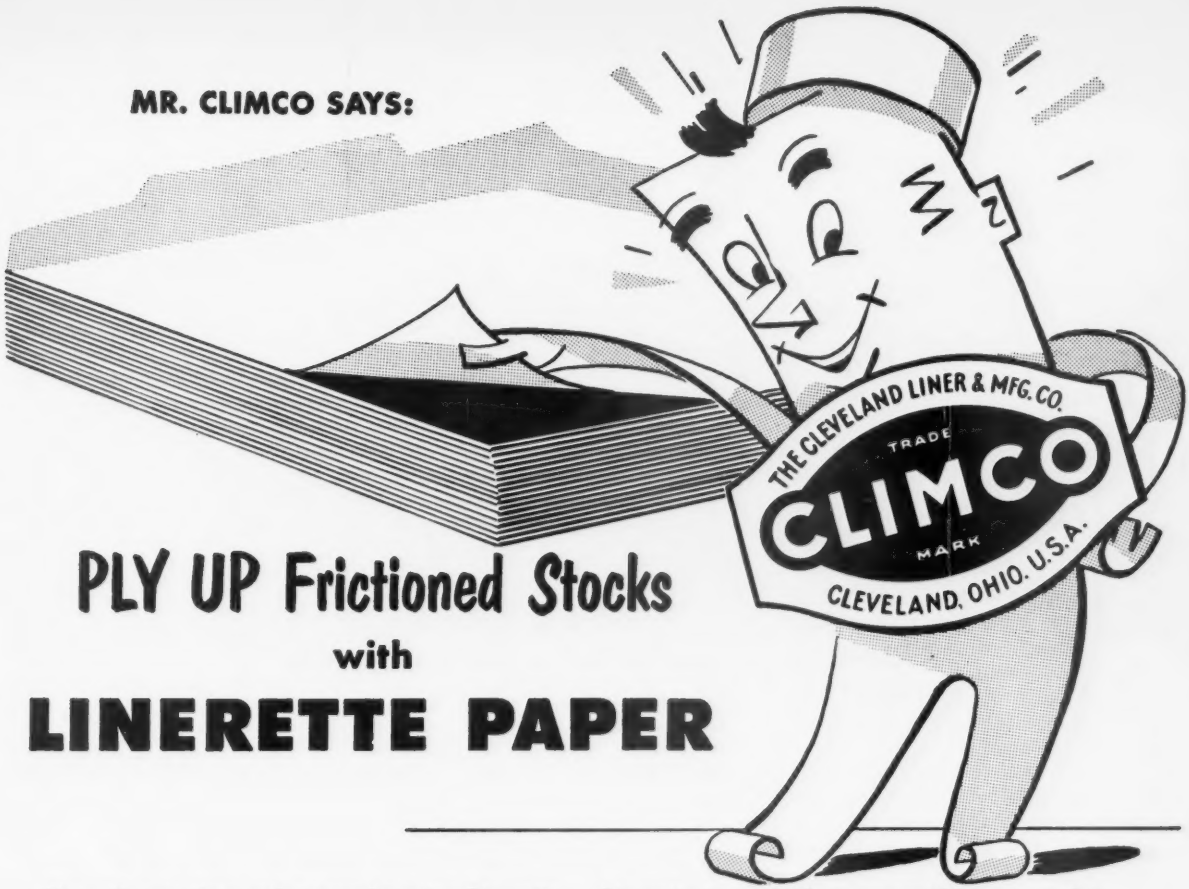

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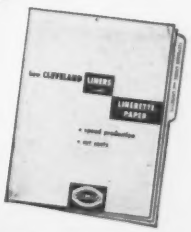

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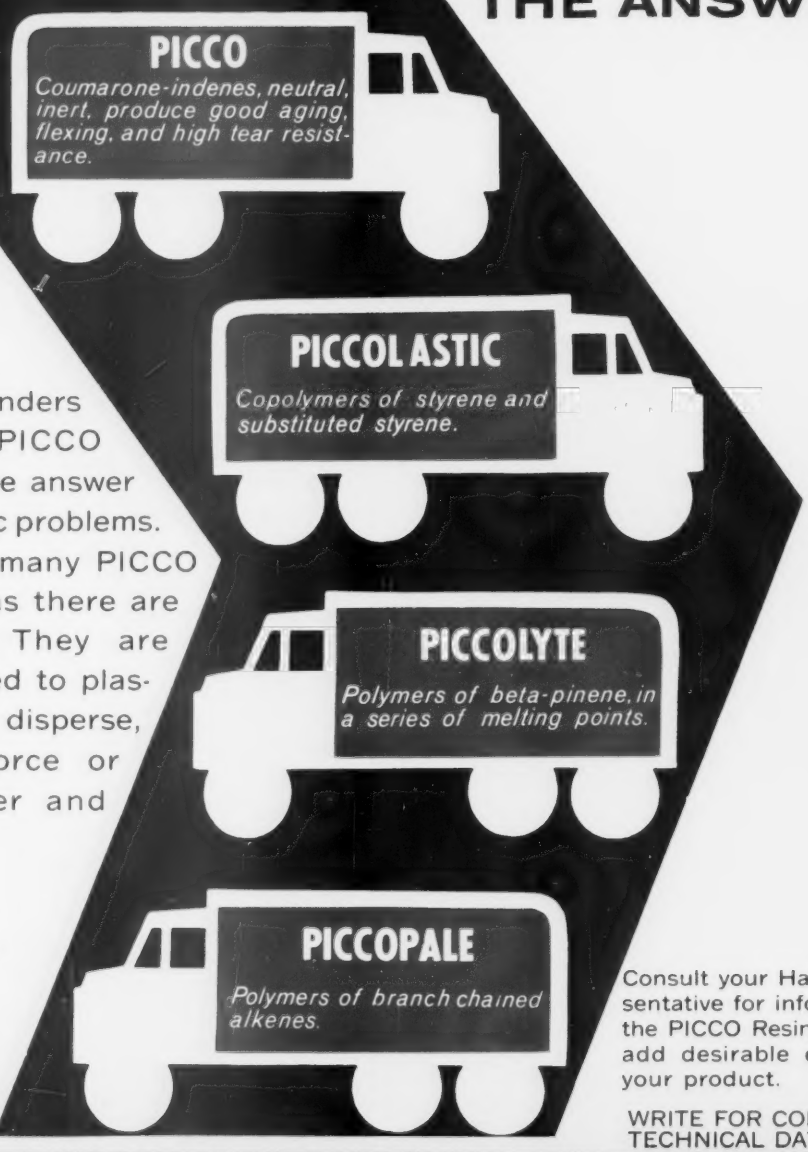
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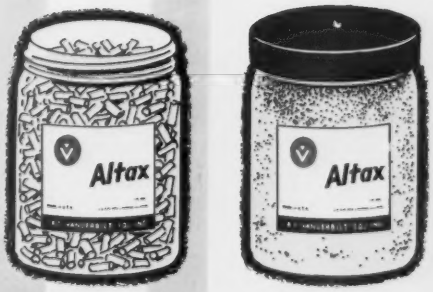

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